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Astronomy

MEASURING SURFACE LAYER TURBULENCE AT MAIDANAK OBSERVATORY WITH LUNAR SCINTILLOMETER

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Abstract

Since 2021, the seeing in the atmospheric surface layer at the Maidanak Observatory has been systematically measured using the Lunar Scintillometer instrument. The measurements were used to quantify the contributions to integral seeing from the ground surface up to heights of 4 m, 16 m, 64 m, and 256 m. On the basis of the obtained results, recommendations were formulated for the design and installation of new telescopes planned at the observatory.

Keywords: atmospheric turbulence, astronomical seeing, Lunar Scintillometer.

Introduction. Astronomical observations are directly affected by the Earth's atmosphere, which introduces distortions in the radiation arriving from celestial objects and partially limits its propagation. Consequently, the quality of the obtained observational results is degraded [1]. Therefore, the investigation of atmospheric characteristics at observatory sites is regarded as one of the most important and relevant tasks for ground-based observatories. In this respect, continuous atmospheric monitoring has been implemented at many observatories. One of the key areas of such studies is the monitoring of atmospheric turbulence. To characterize atmospheric turbulence, the parameter of astronomical seeing has been introduced, which is commonly expressed in arcseconds [2]. Currently, various instruments are employed to evaluate atmospheric turbulence. Among them, the Lunar Scintillometer (LuSci) device is used to assess turbulence in the atmospheric surface layer.

This instrument was originally proposed in 2004 by Hickson and Lanzetta [3]. Subsequently, it has been further developed and implemented at various observatories [4–7]. The LuSci instrument evaluates atmospheric turbulence in the surface layer by recording lunar radiation. In this approach, turbulence is quantified by measuring intensity fluctuations (scintillation) of moonlight induced by atmospheric effects. The LuSci instrument also measures seeing values in the surface layer at different heights (4, 16, 64, and 256 m). The lunar phase is a critical factor for LuSci observations. Observations with the LuSci instrument are conducted during the period from the first quarter to the last quarter of the Moon. In this case, the lunar phase must be 40% or greater. This observational window typically lasts approximately 14–15 days.

An instrument used to measure turbulence throughout the entire atmosphere is the DIMM (Differential Image Motion Monitor) telescope [8]. Using the DIMM device, a bright star located near the zenith is observed, and two images of the star are formed [9]. The centroids of these images vary relative to each other under the influence of atmospheric turbulence. By measuring these relative variations, the astronomical seeing is estimated [10]. The DIMM instrument is currently one of the most widely recognized and extensively used devices worldwide for the evaluation of astronomical seeing at observatories. In particular, this instrument is widely employed at several leading observatories, including Paranal, La Silla, Mauna Kea, CTIO, as well as major observatories located in China, Europe, and Africa.

In 2018, new measurements of seeing using the DIMM telescope were initiated at the Maidanak Observatory [11]. In 2021, the LuSci was commissioned to measure turbulence in the atmospheric surface layer [12]. These measurements were carried out within the framework of collaboration with the European Southern Observatory (ESO).

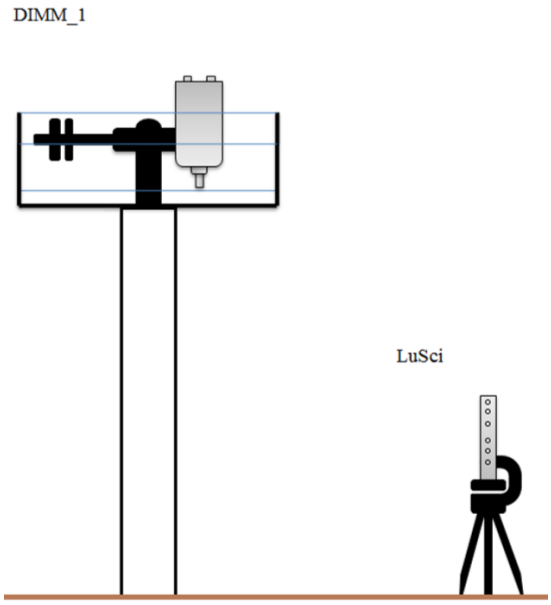

Figure 1. Seeing observations with the LuSci and DIMM instruments at the Maidanak Observatory

Results. Observations with the LuSci were initiated in August 2021 and have been continued up to the present time (Fig. 1). The LuSci device is installed on the ground surface to measure the surface layer seeing. The DIMM device is installed on a special 6-meter platform and seeing measurements are made. The results obtained from synchronous observations with the LuSci and DIMM telescopes are presented in figure 2. The acquired data were processed using the IDL and MATLAB software packages. This figure illustrates the temporal variations of seeing in the atmospheric surface layer and in the entire atmosphere, as measured by both instruments throughout 2021.

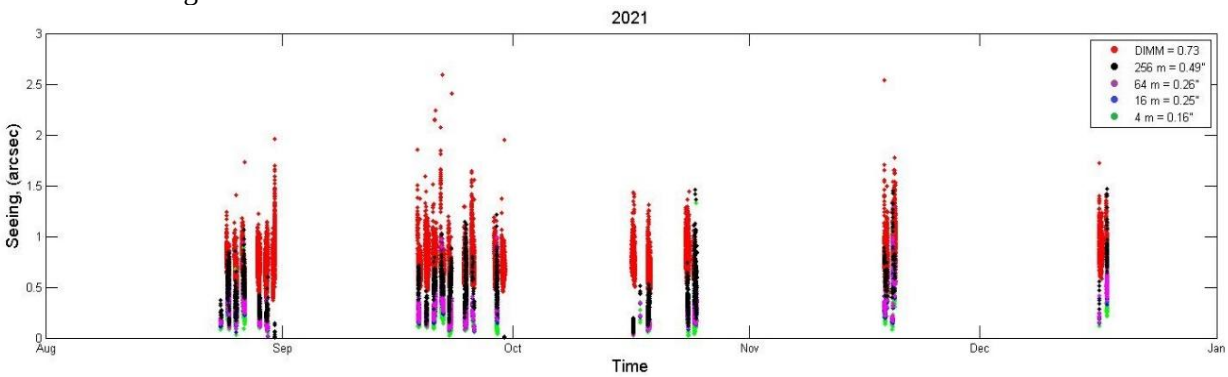

Figure 2. Seeing measurements obtained with the LuSci and DIMM telescopes at the Maidanak Observatory

In the figure 2 shows, the seeing measured over the entire atmosphere using the DIMM telescope is shown in red, while the integral seeing from the ground surface up to heights of 4 m, 16 m, 64 m, and 256 m is represented in green, blue, purple, and black, respectively. During the observation period, the median value of seeing measured with the DIMM telescope at the Maidanak Observatory was found to be 0.73 arcseconds. The integral seeing within the first 4 m above the ground surface was determined to be 0.16 arcseconds, while the values up to 16 m, 64 m, and 256 m were 0.25 arcseconds, 0.26 arcseconds, and 0.49 arcseconds, respectively. The integral seeing at heights of 4 m, 16 m, 64 m, and 256 m accounts for 8%, 17%, 18%, and 51% of the total atmospheric seeing, respectively. The atmospheric turbulence within the first 4 m above the ground surface exhibited the largest contribution in the vertical distribution of turbulence, indicating the presence of strong turbulence in the lowest atmospheric layer. This result is of significant importance for future telescope installations. Based on these findings, it is recommended that the height of new telescopes above the ground should be at least 4 m.

Conclusion

For the first time at the Maidanak Observatory, the turbulence of the atmospheric surface layer was evaluated using the LuSci instrument. According to the obtained results, during the 2021 observations, the

contributions of integral seeing at heights of 4 m, 16 m, 64 m, and 256 m to the total atmospheric seeing were found to be 8%, 17%, 18%, and 51%, respectively.

It is recommended that the height of new telescopes potentially installed at the Maidanak Observatory should be at least 4 m above the ground surface.

At present, measurements of surface layer turbulence are being continued at the Maidanak Observatory in order to further refine the results and improve their accuracy.

References

1. Roddier, F. The Effects of Atmospheric Turbulence in Optical Astronomy. Prog. Opt. 1981, 19, 281–376.
2. A. Tokovinin, “From Differential Image Motion to Seeing”, Publications of the Astronomical Society of the Pacific, vol. 114, no. 800, pp. 1156–1166, (2002).
3. Hickson, P.; Lanzetta, K. Measuring Atmospheric Turbulence with a Lunar Scintillometer Array. Publ. Astron. Soc. Pac. 2004, 116, 1143–1152.
4. Tokovinin, A.; Bustos, E.; Berdja, A. Near-ground turbulence profiles from lunar scintillometer. Mon. Not. R. Astron. Soc. 2010.
5. Lombardi, G.; Melnick, J.; Goñi, R.H.H.; Navarrete, J.; Sarazin, M.; Berdja, A.; Tokovinin, A.; Wilson, R.; Osborn, J.; Butterley, T.; et al. Surface layer characterization at Paranal Observatory. In Proceedings of the SPIE Astronomical Telescopes + Instrumentation, San Diego, CA, USA, 28 June 2010; pp. 1519–1531.
6. González, C.; Lombardi, G.; Sarazin, M.; Char, F.; Bustos, E.; Navarrete, J. Remote controlling of a lunar scintillometer from Paranal to Armazones in the context of the E-ELT site monitoring. Bol. Asoc. Argent. Astron. Plata Argent. 2011, 54, 439–442.
7. Surendran, A.; Parihar, P.S.; Banyal, R.K.; Kalyaan, A. Development of a Lunar Scintillometer as part of the national large optical telescope site survey. Exp. Astron. 2018, 45, 57–79.
8. Sarazin, M.; Roddier, F. The ESO differential image motion monitor. Astron Astrophys. 1990, 227, 294–300.
9. Tillayev, Y.; Azimov, A.; Ehgamberdiev, S.; Ilyasov, S. Astronomical Seeing and Meteorological Parameters at Maidanak Observatory. Atmosphere 2023, 14, 199.
10. A. Tokovinin, V. Kornilov, “Accurate seeing measurements with MASS and DIMM”. MNRAS. (2007), 381, pp.1179–1189.
11. Azimjon M. Azimov, Yusufjon A. Tillayev, Shuhrat A. Ehgamberdiev, Sabit P. Ilyasov “Astronomical seeing at Maidanak Observatory with differential image motion monitor” Journal of Astronomical Telescopes, Instruments, and Systems (JATIS), Vol. 8, Issue 4, 047002 (December 2022).
12. Azimov, A.; Tillayev, Y.; Ehgamberdiev, S.; Rajabov, Y.; Ilyasov, S.; Sarazin, M. Surface Layer Turbulence at the Maidanak Observatory. Atmosphere 2023, 14, 1779.

Economic sciences

TRANSFORMING HIGHER EDUCATION THROUGH AI AND DIGITAL INNOVATION: STRATEGIC RISK AND SUPPLY MANAGEMENT PERSPECTIVES

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Introduction Modern higher education is undergoing rapid transformation under the influence of digitalization and artificial intelligence[1]. Traditional learning models are being replaced by intelligent educational platforms, online courses, and adaptive learning systems, which allow for individualized education, increased effectiveness, and flexibility[2].

In the context of global integration of digital economy and innovations in higher education, universities need to increase their competitiveness and implement risk management strategies. It is also necessary to optimize the supply of educational resources and ensure quality services.

The relevance of this study lies in the fact that digitalization and AI create new opportunities but also pose complex risks such as cybersecurity and uneven access to digital resources.. Monster risk management requires the development of strategic approaches and models that can ensure the sustainable development of educational technologies, optimize technological processes, and improve the quality of educational services. The aim of this research is to develop conceptual and practical approaches for transforming higher education using artificial intelligence (AI) and digital innovations in order to enhance the effectiveness of risk management and supply optimization.

To achieve this goal, the following tasks were assigned:

1. Analyze current trends in digitalization and development in the field of higher education.
2. Identify key risks and challenges associated with the use of digital technologies in educational settings.
3. Develop strategies for risk management and resource optimization using AI in education.
4. Conduct practical assessments of the impact of digital innovations on the quality of learning processes.

Scientific innovations lie in an integrated approach to transforming higher education by combining AI, digital technology, and risk management applications. This approach aims to integrate effective tools and ensure their forecasting, as well as adaptation of learning processes to changing conditions. Additionally, it aims to effectively manage the material, technical, and digital infrastructure of universities.

Theoretical innovation of this work lies in expanding scientific ideas about digital transformations in education systems and modeling effective risk and supply management processes in universities. Practical innovation is demonstrated by the possibility of applying developed recommendations to improve educational process management, reduce operational risks, and optimize resource usage in higher education institutions.

Literature review The issues of digital transformation in higher education, artificial intelligence, and the risks of global governance are widely discussed by both foreign and Chinese researchers. Foreign scholars pay special attention to the impact of digital technologies on the education system, emphasizing that AI is becoming a crucial factor in restructuring traditional learning and management models.

Strielkowski W., in their fundamental works, note that AI and digital innovations are creating conditions for the development of new educational platforms, adaptive systems, and intelligent tools that change approaches to learning and management[3]. Author argue that digital transformation poses several major challenges, such as the risk of technological inequality between universities, the need for regulation, and the form of digital dependency.

Alenezi M., Wardat S., Akour M., in turn, explores critical aspects of digital technologies in education in great detail[4]. They draws attention to issues such as student privacy, the risks of commercialization in

digital platforms, and the need for stronger standards. They work involves developing comprehensive digital risk management strategies.

Chinese researchers are exploring the possibilities of digitalizing higher education in 20 countries around the globe, as well as economic development programs and innovative technologies. Qian L., Cao W., Chen L. have analyzed the impact of artificial intelligence (AI) on modernizing university employment, managing smart campuses, and optimizing educational resources[5]. They note that digital innovations can effectively manage data flows and automate administrative processes, leading to improved quality of educational services. They also emphasize the serious risks associated with cybersecurity and the safety of digital platforms.

In this work, Essa S. G., Celik T., Human-Hendricks N. E. has explored the use of big data and adaptive learning systems, which allow for personalized learning and improved quality control in the educational process[6]. They suggests the need for a key risk management factor to be established that would reduce the reliability of digital employment and ensure the sustainability of processes.

Kazakhstani researchers are also paying great attention to the issues of digitalization of higher education and risk management in the context of artificial intelligence (AI) in educational processes. Nurtayeva D. et al., for example, considers the effectiveness of digital platforms and intelligent learning management systems at universities in Kazakhstan[7]. She notes that the key constraints include insufficient infrastructure, inconsistency of digital solutions with university management tasks, and a high level of operational risk. Apakhayev N. et al. emphasizes the need for integrated digital systems to optimize the use of educational and logistic resources[8].

Omarkhanova A., on the other hand, focuses on a strategic approach to digital risk management[9]. She addresses issues such as cybersecurity, the insufficient digital literacy of staff, and the complexity of adapting to new technological conditions. Her work provides adaptive models for managing risks and consequences based on predictive analytics, which helps to increase the effectiveness of modern educational institutions.

In the course of analyzing literary sources that introduce AI and digital innovation in higher education, as this is a global trend requiring integrated solutions in risk management. Researchers from different countries emphasize the importance of using digital tools, securing digital employment, developing human resource competencies, and creating new management approaches to ensure the sustainability and effectiveness of the system. This cross-country experience is crucial for developing strategies for digital transformation in higher education and improving educational quality.

Research methodology

The method of comparative analysis. The comparative analysis makes it possible to compare the experience of different countries, universities and educational systems in the field of artificial intelligence and digital technologies. This allows us to identify differences and common trends in risk management, digital platforms and resources between China, Kazakhstan and other countries.

This method helps to identify the most effective digital transformation practices, assess the strengths and weaknesses of various strategies and models, and identify factors influencing the success of artificial intelligence in education.

It is especially important to apply comparative analysis to assess the sustainability of professional employment, organizational technologies and the quality of educational services in the context of digitalization.

The Case study method. The case study approach enables a comprehensive examination of the primary manifestations of artificial intelligence and digital transformation in universities. Through this analysis, provides a deeper comprehension of these processes and challenges.

The utilization of case studies helps to explore how AI impacts supply chain management, resource optimization, student learning, and the enhancement of educational services. This method also facilitates the formulation of practical recommendations for mitigating risks, enhancing digital security, and ensuring consistent governance at universities.

This makes it possible to describe the tangible outcomes of technological advancements, identify successful models, and assess their applicability in other educational institutions.

Results and discussion

The application of the comparative resource analysis method systematically evaluates the characteristics of artificial intelligence, digital platforms, and risk management in the top nations of the globe. The findings suggest that the digital transformation of education is progressing at different rates, with each country employing its own model of advancement, which is influenced by factors such as technological infrastructure, regulatory framework, strategic development objectives, and the organizational capacities of educational institutions (in table 1).

Table 1. Features of digital transformation in higher education

Country / Region	Nature of Digital Transformation	Level of AI Integration	Risk Management Approach	Management of Educational Resources & Supply Chains	Key Challenges	Advantages
China	Centralized state digital policy; national unified digital infrastructure	Very high: intelligent campuses, analytics platforms, predictive systems	Centralized governance, strict security standards, national data centers	Intelligent supply-chain systems, automated logistics, unified platforms	Dependence on centralized platforms, limited university autonomy	Rapid implementation, scalability, high efficiency
Western countries (EU, USA, Singapore)	Decentralized models, private EdTech ecosystems, flexible digitalization strategies	High: adaptive LMS, data analytics, AI-based assessment	Hybrid models: GDPR, FERPA institutional cybersecurity strategies	Autonomous digital ecosystems, hybrid logistics, customized solutions	High cost of technologies, fragmented digital infrastructure	High innovation, wide variety of digital solutions, strong institutional autonomy
Kazakhstan	Formation of digital ecosystems under state programs; partial AI integration	Medium: LMS implementation, selected AI tools	Local strategies, limited standardization, varying platform reliability	Limited digital logistics; lack of integrated supply-management systems	Infrastructure limitations, shortage of qualified specialists	Rapid growth of digitalization, state support, strong development potential

The source was compiled based on the data [10-14]

The comparison showed that China is a leader in integrating AI into educational processes and creating intelligent campuses. Government programs such as the AI Education Strategy and the Smart Campus Initiative provide centralized management and high infrastructure support for the adoption of new technologies. These programs also ensure the rapid implementation of digital solutions and minimize the risks associated with digitalization through strict security measures and national data centers. However, there is still a dependence on government platforms and limited autonomy in the use of tools.

In foreign countries, digital transformation is based on the principles of decentralization and the autonomy of educational institutions. A developed ecosystem of private educational technology companies (EdTech) is also present. Adaptive educational platforms, predictive analytics systems, digital campus management, and solutions for automating academic processes are all actively used in countries such as the USA, the EU, and Singapore.

Risks are managed through a combination of strategies, including institutional cybersecurity measures, data protection laws (such as GDPR and FERPA), and specialized digital protocols. However, high costs and the fragmentation of the digital ecosystem can lead to differences in the quality of available digital tools.

Kazakhstan is experiencing dynamic growth in the digitalization of education, although it is still in the process of forming an integrated digital ecosystem. Universities are focusing on implementing LMS platforms, digital tools to automate the educational process, online courses, and individual elements of predictive analytics as the main initiatives.

However, a comparative analysis reveals several limitations in Kazakhstan's digital education landscape. These include an insufficient infrastructure base, unequal digital staff training, fragmented risk management processes, and a lack of integrated educational supply management systems. Despite these challenges, Kazakhstan possesses significant potential for growth thanks to the "Digital Kazakhstan" state program, the modernization of university infrastructure, increasing employer demand for digital skills, and increased investment in the EdTech sector. The data obtained confirm that the most resilient educational systems are those that strike a balance between state standards, AI-driven predictive analytics models, and the autonomy of universities in developing and implementing digital solutions. This approach ensures a high level of safety, adaptability to changes, and the ability to modernize effectively.

This approach is particularly relevant for Kazakhstan. Comparative data suggest that to successfully accelerate digital transformation, it is advisable to incorporate the most effective elements of foreign practices. These include the scalability of digital solutions and government support, which are typical of China, as well as the innovative flexibility and diversity of digital platforms, which are characteristic of Western models. By combining these elements, Kazakhstan can develop its own digital educational ecosystem in a balanced and strategically sustainable manner.

Integrated AI-powered educational supply management systems employed in China and Singapore can serve as a blueprint for enhancing the logistics support provided to Kazakhstani universities. These systems

have demonstrated their ability to effectively manage campus logistics, digitally monitor resources, and automate supply processes, which can potentially lead to a substantial improvement in the operational sustainability and quality of educational services in Kazakhstan.

Modern universities are actively using artificial intelligence (AI) and digital platforms to improve educational processes, optimize resource management, and minimize risks. Examples of such initiatives include the projects at Harvard University, MIT, Stanford University, and Tsinghua University in China. These projects demonstrate how AI can help personalize learning, predict academic performance, and efficiently manage educational resources.

Harvard and MIT have developed the HarvardX and MITx platforms, based on Coursera and edX. These platforms use adaptive algorithms to analyze students' progress and predict their risk of expulsion.

Stanford University has implemented intelligent digital resource management systems and automated laboratory complexes, which reduce teachers' workload and improve the accuracy of knowledge assessment.

Tsinghua University has created the national Smart Campus platform. AI is used on this platform to monitor attendance, predict the need for educational materials, and manage digital resources. This ensures more flexible planning and reduces operational risks.

These instances demonstrate that the incorporation of artificial intelligence enables the enhancement of the educational experience, the personalization of learning, and the reduction of operational and academic hazards(in table 2).

Table 2. Examples of active AI implementation cases in higher education

University / Country	AI Technologies and Digital Platforms	Problem / Challenge	Implemented Solutions	Results / Effects
Harvard University & MIT, USA	HarvardX, MITx, Coursera/edX platforms, adaptive algorithms	Personalization of learning, prediction of academic performance, high faculty workload	Adaptive learning, automated assignment grading, Early Warning Models for identifying dropout risks	Student retention increased by 34%, faculty workload reduced by 22–28%, early identification of dropout risk accuracy 92%
Stanford University, USA	Intelligent LMS, automated laboratories, progress monitoring systems	Optimization of educational resources, improvement of assessment accuracy, reduction of operational workload	Automated grading, digital laboratory complexes, big data analytics	Teaching efficiency improved, grading time reduced by up to 50%, improved quality of student feedback
Tsinghua University, China	National “Smart Campus” platform, AI for monitoring, forecasting, and resource management	Management of attendance, forecasting demand for learning materials, optimization of educational resources	AI-based attendance monitoring, predictive analytics for material demand, integration with digital libraries	Shortage of educational resources reduced by 40%, planning flexibility increased, operational risks decreased by 25%

The source was compiled based on the data [15-17]

A review of the experiences of top universities reveals that the implementation of artificial intelligence and digital platforms in higher education substantially enhances the effectiveness of the educational process and the management of resources.

At Harvard University and MIT, the application of adaptive algorithms and the Harvard and MIT platforms not only enabled personalized learning but also lightened the workload of instructors by automating the process of grading assignments and promptly identifying students at risk of expulsion. This demonstrates that AI can be a powerful instrument for strategic academic risk management, while simultaneously boosting student retention and the quality of educational support.

The case of Stanford University demonstrates the potential of AI in streamlining the administration of educational resources. The intelligent learning management system, automated laboratory facilities, and big data analytics enable a more precise evaluation of knowledge, expedite student feedback, and decrease transactional expenses. This proves that the digitalization of educational processes empowers universities to allocate resources efficiently, minimize human error, and enhance the visibility of educational activities.

The example of Tsinghua University illustrates the incorporation of artificial intelligence into the administration of the entire educational framework, encompassing student attendance tracking, forecasting the demand for educational resources, and managing digital libraries. This strategy enhances planning adaptability and minimizes operational hazards. It is crucial that predictive analytics enables not only immediate response to students' current requirements but also anticipates future resource-intensive scenarios, thereby ensuring the resilience of the educational system in a dynamically evolving context.

A comparative examination of all three scenarios enables us to draw several significant insights. Firstly, the utilization of AI and digital platforms significantly enhances the personalization of learning and risk assessment, which is crucial for student retention and academic success. Secondly, the automation of

educational processes and resource management through AI enables universities to reduce operational expenses and optimize the utilization of their infrastructure. Thirdly, the incorporation of AI into the strategic management of educational processes ensures the long-term viability of university systems, allowing them to promptly adapt to fluctuations in demand for educational resources and digital services.

The experience of leading universities demonstrates that effectively implementing AI necessitates a comprehensive strategy, encompassing adaptive educational platforms, automated resource management processes, and risk monitoring and forecasting systems. These examples can be a valuable resource for other universities, including those in Kazakhstan and China, aiming to enhance the effectiveness and resilience of their educational systems in the era of digital transformation.

The study, conducted using comparative analysis and the case method, suggests that the introduction of artificial intelligence and digital platforms into the higher education system has a comprehensive positive impact on the effectiveness of educational process management.

On the one hand, comparative analysis shows that the use of artificial intelligence makes it possible to more accurately predict the need for educational resources, optimize their supply process and minimize operational and academic risks, especially when combining centralized standards and institutional autonomy.

On the other hand, an analysis of the experience of leading universities shows that the use of adaptive algorithms and student performance monitoring systems contributes to individualizing learning, increasing student engagement and reducing the burden on teachers.. All these results together show that the use of digital technologies and artificial intelligence provides a powerful impetus for the development of education. This helps to improve the quality of education and the efficient use of resources.

Conclusion

The research, which includes a comparative study of international practices and a case analysis of top universities, provides a comprehensive overview of the transformation of higher education in the era of artificial intelligence and digital innovation. The digitalization and implementation of AI technologies enable universities to enhance the effectiveness of educational process management, personalize learning experiences, optimize resource utilization, and mitigate operational and academic risks. The analysis revealed that countries with robust infrastructure and well-defined AI integration strategies, such as China and leading universities in the United States, achieve remarkable success in accurately predicting the demand for educational resources, minimizing excess inventory, and improving the quality of educational services.. Simultaneously, the examples of Harvard, MIT, Stanford, and Tsinghua illustrate that adaptive learning systems, automated platforms, and big data analytics contribute to student retention, enhance the accuracy of knowledge assessment, and alleviate the workload for instructors. The convergence of risk management approaches, the digitalization of resources, and the implementation of AI creates an environment for the sustainable development of university systems, enabling them to promptly adapt to changes in the educational landscape, enhance the competitiveness of universities, and ensure long-term strategic stability. Therefore, the integration of artificial intelligence and digital innovations is a pivotal factor in modernizing higher education, simultaneously improving the educational quality, streamlining processes, and enhancing the sustainability of educational systems in the global digital economy.

References

1. Mohamed Hashim M. A., Tlemsani I., Matthews R. Higher education strategy in digital transformation //Education and information technologies. – 2022. – T. 27. – №. 3. – P. 3171-3195.

2. Liu M., Yu D. Towards intelligent E-learning systems //Education and Information Technologies. – 2023. – T. 28. – №. 7. – P. 7845-7876.

3. Strielkowski W. et al. AI-driven adaptive learning for sustainable educational transformation //Sustainable Development. – 2025. – T. 33. – №. 2. – P. 1921-1947.

4. Alenezi M., Wardat S., Akour M. The need of integrating digital education in higher education: Challenges and opportunities //Sustainability. – 2023. – T. 15. – №. 6. – P. 4782.

5. Qian L., Cao W., Chen L. Influence of artificial intelligence on higher education reform and talent cultivation in the digital intelligence era //Scientific Reports. – 2025. – T. 15. – №. 1. – C. 6047.

6. Essa S. G., Celik T., Human-Hendricks N. E. Personalized adaptive learning technologies based on machine learning techniques to identify learning styles: A systematic literature review //IEEE Access. – 2023. – T. 11. – P. 48392-48409.

7. Nurtayeva D. et al. The role of digital technologies in higher education institutions: The case of Kazakhstan //Problems and Perspectives in Management. – 2024. – T. 22. – №. 1. – P. 562.

8. Apakhayev N. et al. Distance learning technologies and their legal regulation in the Republic of Kazakhstan //E-Learning and Digital Media. – 2025. – T. 22. – №. 2. – P. 156-170.

9. Omarkhanova A. et al. Risk management in the public sector of Kazakhstan: current state and development opportunities //Public Policy and Administration. – 2024. – T. 23. – №. 2. – P. 222-236.

10. Kang L., Xu X. Progress and prospect of digital transformation of higher education in China: Bibliometric and visualized analysis //Journal of Adult and Continuing Education. – 2025. – T. 31. – №. 1. – P. 109-134.

11. Kaputa V., Loučanová E., Tejerina-Gaite F. A. Digital transformation in higher education institutions as a driver of social oriented innovations //Social innovation in higher education. – 2022. – T. 61. – P. 81-85.

12. Akour M., Alenezi M. Higher education future in the era of digital transformation //Education Sciences. – 2022. – T. 12. – №. 11. – P. 784.

13. Nguyen-Anh T. et al. Digital transformation in higher education from online learning perspective: a comparative study of Singapore and Vietnam //Policy Futures in Education. – 2023. – T. 21. – №. 4. – P. 335-354.

14. Gulmira B. et al. Aspects of digital transformation of higher education in the republic of kazakhstan //International Conference on Computational Science and Its Applications. – Cham : Springer Nature Switzerland, 2024. – P. 111-123.

15. Anyaso K., Anyaso S. Transforming US higher education with artificial intelligence: Opportunities, ethical challenges, and strategies for effective implementation //International Journal of Science and Research Archive. – 2025. – T. 14. – №. 3. – P. 545-554.

16. Lu C. A. Tracing the Evolution of Artificial Intelligence Education at Stanford University //TechTrends. – 2025. – T. 69. – №. 2. – P. 447-453.

17. Wen W. et al. Urban/rural disparities in access to elite higher education: the case of Tsinghua University //International Journal of Chinese Education. – 2023. – T. 12. – №. 2. – P. 1-15

INSTRUMENTS OF NATIONAL AND CORPORATE ORGANIZATIONAL CULTURE IN THE APPLICATION OF ADVANCED PERSONNEL MANAGEMENT METHODS

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Abstract

This article examines the role of national and corporate organizational culture in shaping the effectiveness of advanced human resource management (HRM) methods. Drawing on competence-based and organizational-cultural approaches, the study conceptualizes the HR manager as a multi-role professional whose activities integrate strategic, technological, consultative, and operational functions. The paper identifies key competence domains that underpin successful HR practice and demonstrates how their relative importance reflects the growing significance of ethical conduct, communication, and teamwork in contemporary organizations.

The article further traces the historical evolution of HRM paradigms in the twentieth century—from scientific management and the human relations movement to individual responsibility contracting and team management—showing how each paradigm corresponds to specific forms of organizational culture. Special attention is given to the emergence of participatory organizational culture as the most advanced framework for managing complex, knowledge-based, and collaborative work.

It is argued that the effectiveness of team-based and participatory HRM models depends on the maturity of national and corporate organizational cultures, particularly on the presence of bureaucratic, organic, and entrepreneurial elements in modernized form. The study concludes that advanced HRM instruments cannot be mechanically transferred across cultural contexts without considering their institutional and cultural foundations.

In conclusion, the article notes that the final paradigm represents a synthesis of bureaucratic, organic, and entrepreneurial organizational cultures within a participatory framework. It is also noted that without historically developed and modernized elements of all three cultural types, effective team management cannot be fully implemented. Weak organizational structures, poor moral climate, or low professional standards limit the applicability of the most advanced HR tools. In summary, this explains why HR technologies cannot be mechanically transferred from one national or corporate context to another.

Keywords: Human resource management; organizational culture; HR competencies; participatory management; team management; organizational development; professional roles; corporate culture; national culture

Introduction. If competence models are applied to the professional characteristics of human resource managers, it becomes clear that such a model cannot be either one-dimensional, describing a relatively simple type of activity, or purely abstract, summarizing a class of related activities. Instead, it must represent a complex, multi-layered form of activity that incorporates other forms of activity as its elements. Consequently, the competence model of a human resource manager constitutes a multi-role professional profile. [1]

Designing the Professional Profile of a Human Resource Manager

The development of a multi-role professional profile for an HR manager requires the identification of the following components:

- current and anticipated future trends in business organization, industry, market environment, and technology that may significantly influence HR functions;
- the set of key areas of responsibility of the HR manager;
- the most critical tasks and expected outcomes from the perspective of HR management;
- performance criteria for each key function;
- the core set of competencies, skills, and abilities required to fulfill each function and achieve desired results;
- patterns of professional behavior through which HR competence is expressed.

Drawing on the experience of successful corporations and projections of future HR systems, several key professional roles of the HR manager can be identified.

Key Professional Roles in Human Resource Management

1. **HR Strategist** — a member of the top management team responsible for developing and implementing HR strategy and the organizational mechanisms that support it (e.g., Vice President for Human Resources).
2. **Head of the HR Department** — responsible for organizing and coordinating the work of HR units.
3. **HR Technologist** — a designer and implementer of innovative HR tools and practices, possessing specialized and technological knowledge and able to mobilize internal and external resources in accordance with the organization's strategic goals (e.g., Head of Organizational or Personnel Development).
4. **HR Innovator** — a leader responsible for initiating and managing experimental and pilot HR projects that require careful development before being introduced into routine practice.
5. **HR Executor** — a specialist who implements operational HR policies.
6. **HR Consultant** (internal or external) — a professional who uses a holistic understanding of organizational development, together with expertise in human resource management, to identify problems, opportunities, and solutions related to human and organizational potential.[1]

Core Areas of HR Competence

Research into HR competence has identified eleven core areas that are critical across all six professional roles. These competencies are grouped into three domains.

1. Personal Integrity

- **Ethical conduct** — respect for individual rights, honesty, reliability, fairness, and responsibility for commitments.
- **Conscientiousness** — high personal standards regarding work quality.
- **Sound judgment** — the ability to make balanced, realistic, and well-reasoned decisions.

2. Goal Orientation and Performance

- **Result orientation** — focus on achieving measurable outcomes.
- **Perseverance** — the ability to overcome situational constraints.
- **Organizational commitment and business orientation** — adherence to organizational norms, dedication to work, and responsibility for performance quality.
- **Self-confidence** — readiness to deal with non-standard and complex tasks.

3. Teamwork and Communication

- **Team orientation** — the ability to work effectively in cooperative settings.
- **Interpersonal openness** — capacity to establish professional and creative relationships.
- **Communication competence** — effective use of oral and written language to influence and achieve mutual understanding.
- **Listening skills** — the ability to perceive, interpret, and apply information obtained through interaction.

Expert evaluations rank these competencies in the following order of importance for HR effectiveness:

1. Ethical conduct
2. Communication competence
3. Listening skills
4. Interpersonal openness
5. Team orientation
6. Conscientiousness
7. Sound judgment
8. Result orientation
9. Perseverance
10. Self-confidence
11. Organizational commitment and business orientation. [2]

Organizational Culture and the Evolution of HR Management

The development of collaborative creative activity is historically linked to transformations in the organization of joint work—from sequential cooperation to interactive cooperation to jointly individualized activity. During the twentieth century, this progression shaped the core forms of collective creativity in organizations, particularly in developed economies. From an organizational-cultural perspective, these changes can be understood as phases in the emergence of participatory organizational culture. The successive

transformations of bureaucratic, organic, and entrepreneurial cultures gave rise to corresponding paradigms of personnel management.

The technocratic approach, rooted in positivist philosophy and exemplified by Frederick Taylor, emerged to address the need for efficiency in large-scale industrial systems oriented toward mass production. Workers were treated as components of human-machine systems, and management focused on rationalizing labor through control and reward mechanisms. The ultimate objective was to maximize the utilization of all system elements, including human labor.

By the late 1920s, however, the negative social consequences of this model became apparent, prompting social experiments such as Elton Mayo's Hawthorne studies. These led to the doctrine of **human relations**, which emphasized the humanization of labor, worker participation, and the positive effects of group dynamics. For the first time, employees were recognized as partners—albeit unequal ones—in resolving workplace and labor relations, supported institutionally by trade unions.

By the mid-twentieth century, however, collectivist professional ideology began to hinder technological innovation. In response, a new HR paradigm emerged in the 1960s and 1970s, focusing on individual professional development, personal incentives, and responsibility. This model aimed to stimulate entrepreneurial behavior among employees and enhance organizational competitiveness.

Yet excessive individualism eroded organizational cohesion and morale. As a corrective, organizations turned again to collective values, especially in environments that require complex teamwork. During the structural crises of the 1970s, the creation of effective work teams became a strategic priority. This gave rise to **team management** in the 1980s–1990s, emphasizing self-organization, shared values, collective responsibility, mutual support, and the full use of individual and group potential.

Paradigms of HR Management in the Twentieth Century

Four major paradigms can be distinguished:

- scientific management;
- human relations;
- individual responsibility contracting;
- team management.

The proposed areas of work with personnel deserve attention because they bring together the experience of successful companies and modern management concepts. However, the operating conditions of enterprises differ in terms of financial condition, staff remuneration, and corporate morality. [3]

Personnel management is a specific function of managerial activity, the main object of which is a person belonging to certain social groups. Modern concepts of personnel management are based, on the one hand, on the principles and methods of administrative management, and on the other hand, on the idea of comprehensive personality development and the theory of human relations.

The personnel management system is a set of principles and methods for managing workers and employees within the enterprise.

The organization's personnel management system consists of six interconnected subsystems:

- personnel policy;
- recruitment of personnel;
- personnel assessment;
- staff placement;
- staff adaptation;
- staff training.

Policy defines the general line and fundamental principles for long-term personnel work. The Parliament formulates the State personnel policy, the ruling party, and the Government, and is primarily determined by the type of power in society. The kind of authority significantly impacts leadership strategy and style, as well as personnel requirements. The fullest expression of a person's creative potential is possible only in a democratic society. The transition to a market economy is accompanied by a process of democratizing management and is reflected in the organization's philosophy. The board of directors formulates the personnel policy at the enterprise, the management board, and the enterprise director.

Recruitment involves building a reserve of personnel to fill vacant positions. Recruitment should include procedures for calculating personnel needs by employee category, a normative description of professional requirements for workers and employees, methods for selecting personnel, and general principles for forming a reserve of personnel for vacant positions. Thus, the main task of personnel selection is to identify a set of people who can take new jobs (positions) in the near future and change their occupation, based on internal

motivation and material or moral incentives. Recruitment is primarily determined by personnel requirements derived from the subsystems of personnel policy and workplace models.[3]

Personnel assessment is carried out to determine whether an employee is suitable for a vacant or occupied position. When filling a vacant position, it is essential to assess an employee's potential, i.e., professional knowledge and skills, life and work experience, socio-psychological personality type, level of general culture, state of health and efficiency, and several other characteristics. The assessment of potential allows us to judge the likelihood that a particular person's abilities will be applied in a given position. The analysis of the employee's compliance with the position (certification) is necessary after a specific period of time. It can be conducted through a joint assessment of creative potential and individual contribution, taking into account the results of the work.

The placement of personnel should ensure constant movement based on the results of an assessment of their potential, individual contribution, planned career, age, terms of employment, and the availability of vacant positions in the enterprise staffing table. Scientifically based personnel placement provides for career planning, taking into account their vital interests; a rational combination of appointment, competitiveness and electability, depending on the category of employees and the personnel reserve; systematic movement of staff (promotion, relocation, demotion and retirement) depending on the results of the assessment; determination of the terms of employment and the age of management personnel; scientific organization of the workplace; determination of working conditions and remuneration.

Personnel adaptation is the process of adapting a team to the changing conditions of an organization's external and internal environments, and individuals to the workplace and the workforce.

Employee adaptation also includes key elements such as adaptation criteria, probation organization, adaptation of young professionals, mentoring and consulting methods, and human resource development. The adaptation is completed by the entry of employees into a permanent position. [4]

Staff training is designed to ensure that employees' professional knowledge and skills align with modern production and management standards. There are four types of training: training of workers and employees in vocational schools, technical schools and universities, providing for obtaining a fundamental specialty; advanced training in educational institutions (centers, schools, institutes), i.e. obtaining new knowledge in the basic specialty of an employee; retraining of personnel to acquire a new specialty; postgraduate professional education (master's degree, postgraduate, doctoral studies). The interaction of these types of training enables continuous improvement in each employee's education and timely regulation of the correspondence between the number of employees and the professional qualification structure of the staff.

Conclusion

The final paradigm represents a synthesis of bureaucratic, organic, and entrepreneurial organizational cultures within a participatory framework. Without historically developed and modernized elements of all three cultural types, effective team management cannot be fully implemented. Weak organizational structures, poor moral climate, or low professional standards limit the applicability of even the most advanced HR tools. This explains why HR technologies cannot be transferred mechanically from one national or corporate context to another.

References

1. Business Ready (B-READY) 2025; available at: http://www.doingbusiness.org/rankings
2. UN Trade and Development; available at: http://www.unctad.org/fdiprospects
3. Global Policy Forum; available at: https://www.globalpolicy.org/globalization.html
4. Foreign Direct Investment by Country: 1996-2022; available at: https://www.datalab.ge/ge/dataview/v/360/

A STUDY OF THE IMPACT OF BIG DATA AND AI ON THE MANAGEMENT OF THE STATE-OWNED ENTERPRISE

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Introduction

The rapid development of digital technologies, in particular technologies for processing big data and artificial intelligence, has a significant impact on changing modern management models of organizations[1]. In the context of the digitalization of the economy, data processing technologies are becoming key indicators of the effectiveness of management processes, the validity of decisions made and the stability of socio-economic systems. These processes are becoming particularly important on a national scale, where enterprises are directly related to the performance of socially significant functions and the implementation of strategic development priorities.

State-owned enterprises play an important role in the country's economy and operate under ever-increasing pressure from the market, society, regulatory authorities and international performance standards. In this regard, the introduction of modern analytical tools and intelligent systems is of strategic importance, as it ensures transparency of management processes, supports the quality of decisions made, optimizes the use of resources and contributes to the development of government organizations. As a result of the study of large amounts of data and the use of artificial intelligence in the management of state-owned enterprises, it acquires special scientific and practical significance.

The relevance of this study is also determined by the need to increase the efficiency of the public sector in the context of the digital transformation of the economy. Despite the active introduction of digital technologies, some government organizations face problems such as data fragmentation, poor quality, limited automation of management processes, insufficient level of analytical maturity and lack of a systematic approach to the introduction of artificial intelligence technologies.

The scientific novelty of the research lies in the development of an integrated approach to the use of big data and artificial intelligence technologies in the management systems of state-owned enterprises. This study examines the features of the digital transformation of the public sector, technological aspects, barriers and conditions conducive to improving analytical and intelligent solutions. It also substantiates changes in management functions under the influence of digital technologies and decision support systems based on artificial intelligence.

The purpose of the study is to analyze the use of public technologies of big data and artificial intelligence to improve the efficiency of state-owned enterprises, as well as to develop practical strategies for managing them in the course of their activities.

To achieve this goal, it is necessary to solve the following tasks:

1. To analyze the theoretical foundations of the use of big data and artificial intelligence technologies in the field of enterprise management.
2. Identify the specifics of state-owned enterprises and the requirements for their management systems.
3. To explore existing approaches and practices of applying digital technologies in the modern world.

Theoretical research in the field of innovation is aimed at developing scientific ideas about digital transformations in the public administration system and expanding the categorical apparatus for systematizing data, approaches to using large amounts of information and artificial intelligence in the management processes of state-owned enterprises. The research results contribute to the deepening of the theoretical foundations of public administration and the digital economy.

The practical significance of the research lies in the possibility of applying the results obtained, the developed models and recommendations in the activities of state enterprises and authorities. The results of the work can be used to improve the effectiveness of management decisions, information tools, management and forecasting system settings, as well as to form strategies for the digital transformation of government organizations.

Thus, the research is aimed at solving one of the key tasks of modern public policy – improving the effectiveness of public administration using digital technologies, which determines its relevance and innovativeness from both scientific and practical points of view.

Literature review

In recent times, there has been a surge in the use of Big Data and AI to manage the economy, public services, and large corporations. Simultaneously, both practical investigations and theoretical studies are being conducted, exploring the possibilities, dangers, and prerequisites for successful transformation.

Kazakhstani authors write that the development of artificial intelligence and big data analysis technologies is one of the priorities of the country's digital development[2]. And Rawat R., Yadav R. write that "Big Data is large amounts of data that are difficult to process using processing methods; it is data used for analysis and decision—making" — which indicates a paradigm shift: from "paper-based" procedures to algorithmically-backed solutions in enterprises[3]. Kim Y. et al. claim that in Kazakhstan, modern artificial intelligence (AI) technologies and statistical data analysis are becoming increasingly important in the "development and implementation of public policy"[4].

The latest study by this author of agriculture and the agro-industrial complex (AIC), published in 2024, notes that AI and big data open up new opportunities for "risk management, they allow us to analyze large amounts of data and make informed decisions." This is an example of the applied use of technology in existing States today.

Thus, as official documents and recent initiatives demonstrate, the use of big data and AI in Kazakhstan is not an abstract prospect, but part of the government's digitalization strategy.

Empirical studies that examine the relationship between digital transformation (artificial intelligence and big data) and company performance are increasingly common in scientific and international research.

For example, the authors conclude that "digital transformation, driven by artificial intelligence, significantly improves the efficiency of companies"[5]. At the same time, "green digital innovations" act as an intermediary in this process, and "cooperation between humans and artificial intelligence" leads to both a direct effect and mediation[6].

The researchers argue that "the expansion of the volume and variability of information" entails the need to revise traditional management methods. This is relevant not only for modern enterprises, but also for government and public organizations that seek to optimize management, planning, analytics, and decision-making processes.

The economic simulation of China and the United States (2025) has shown that in a scenario where AI acts as a productive agent, the economic impact can be greater than in conventional models[7]. This accelerates technological advancement and enhances competitiveness at the macro level.

This suggests that AI is not merely a tool for optimization, but a fundamental driver of the economic system transformation. It can impact the management, productivity, and strategic positioning of both enterprises and nations.

Based on the sources reviewed, several key conclusions and influences can be identified:

Big data and AI are the main drivers of digital transformation in both Kazakhstan and China[8]. The authorities and companies in these countries are creating the basis for change, efficiency gains, resource optimization, and data-driven decision-making.

Success depends on organizational policies, the progress of business processes, the use of quality data, employment, and management reforms. The use of AI/big data is particularly important for state-owned enterprises and public administrations, as it can ensure transparency, control, efficiency in budgetary and personnel processes, improve service provision, and enhance management quality.

Despite the active interest and numerous initiatives, the review reveals that:

At present, there is a lack of academic, empirical research and measurement of the actual outcomes of AI/Big Data in government agencies and the public sector. Most of the available information comes from strategic documents, plans, concepts, and statements.

Also, there is insufficient attention paid to ethical, legal, and societal aspects, such as data confidentiality, accountability, sustainability, governance, the human element, staff qualifications, and protection of society.

Research methodology

To study big data and artificial intelligence in the management of a public enterprise, two complementary research methods were applied: case study and comparative analysis.

The case study method involves a detailed analysis of one or more examples illustrating the use of artificial intelligence and big data technologies in the management activities of government organizations. This

method allows us to identify the practical aspects, difficulties and results of the introduction of digital innovations.

In the course of the study, specific examples of the use of artificial intelligence and big data analysis in government organizations in Kazakhstan can be considered. Examples include state-owned enterprises operating in the fields of public finance, logistics, and the agro-industrial complex.

The advantages of a case study are that it allows you to get detailed and practical information on how to start using artificial intelligence and big data. It takes into account the specifics of healthcare and specific processes, and also helps to develop recommendations for the introduction of digital technologies in such enterprises.

The second method is the method of comparative analysis, which consists in comparing indicators, approaches and results management with and without the use of big data and artificial intelligence technologies, as well as in considering various state-owned enterprises among themselves.

The use of this method in management involves studying the effectiveness, processes, and end results of state-owned enterprises before and after the introduction of artificial intelligence and big data technologies.

The advantages of comparative analysis lie in its ability to objectively identify differences and trends between different organizations and methodologies, develop recommendations based on national best practices, and evaluate the effectiveness of technologies and their impact on management processes.

Results and discussion

Through the use of the case study method, it was found that one of the major government projects, Smart Data Ukimet, is an information and analytical system in Kazakhstan. It is designed to collect, store, and analyze data from government information systems.

The platform is designed to aggregate information from various sources and provide government officials with the opportunity to use analytical tools and artificial intelligence to make decisions.

According to reports, by mid-2025, 124 systems had been integrated through the platform, which allowed for about 80 analytical results. Several thousand government employees have gained access to the platform(Kazakhstan’s Digital Evolution: From eGov to AI Governance[9].

In addition to this community, eGov is a digital "electronic government" platform. The new version of the eGov mobile application includes features such as intelligent search, a virtual assistant, biometric verification, and a digital identity card. These features allow users to access government services more easily.

The eGov Business service has also been introduced for entrepreneurs and businesses - a "one-stop shop" for registration, application for subsidies, risk assessment, and management of documents[10].

According to international surveys, using data sets and analytics tools helps make better decisions. It also helps to reduce bureaucracy and the work load on businesses.

Digitalization of services makes it easier to get online services. It also speeds up processes that used to need paper. This makes government regulations more transparent and reduces corruption.

But there are challenges with digitalization. It needs a lot of investment to make things like supercomputers and high-performance systems. It also needs people to be more digital literate and know how to work with AI. Also, the government needs to protect information. It needs good rules to make sure that information is safe. But in Kazakhstan, it can change how the government works. It can be more modern and digital. It will be easier to work with people.

Kazakh enterprises, including large corporations and individual businesses, have begun introducing elements of "digital factories" into their operations. This includes automation of equipment usage, monitoring and management of production processes, as well as the implementation of big data and analytics systems.

One example of this is Khimfarm JSC, which has implemented several digitalization projects, including production and support process management, data analysis, and human resource management. This demonstrates that even industrial enterprises, not just IT companies, can benefit from digital transformation through the use of big data and artificial intelligence (AI) to manage, plan, and improve efficiency. This is particularly important for large companies and the public sector, where the scale and complexity of processes are significant[11].

The introduction of big data and artificial intelligence in Kazakhstan's enterprises has led to a complex situation that significantly worsens management processes and the quality of production solutions. According to materials from the Government of Kazakhstan, digitalization and Industry 4.0 elements have managed to fully automate accounting for equipment and production operations, allowing for predictive and relevant information to be generated for operational decision-making[12].

This transition has resulted in reduced downtime, optimized resource usage, and increased efficiency. The use of digital systems and AI at several production sites has increased equipment productivity by over

10% and improved production forecasting and planning. This is particularly important for companies that focus on economic markets or government contracts.

Digital transformation also reveals a number of challenges and limitations that require systematic solutions[13]. These include issues related to data security, privacy, and the need for skilled professionals to manage and analyze large amounts of data. The main challenge was the need for a comprehensive reorganization of business processes. Companies need to adapt their internal procedures, upgrade their infrastructure, and invest in training their staff, as working with specific data and artificial intelligence (AI) involves new technologies and a new culture of interaction with digital tools. The effectiveness of these technologies directly depends on the quality of the data, its regularity of updating, and the accuracy of the input. Even advanced algorithms cannot produce results if the data is not accurate.

Additional risks are associated with technical issues caused by staff inexperience, possible resistance to change, and a lack of domestic data analysts, which increases the dependence on external IT resources.

Despite these limitations, the experience of Kazakhstan companies shows that integrating big data and AI has become a prerequisite for improving their competitiveness, transparency, and efficiency in public and economic management.

According to recent publications, Kazakhstan is developing a "smart city" direction — the Sergek platform is a Kazakhstani integrated AI platform for creating a "smart city" developed by Sergek Group[14]. It is designed to manage traffic, ensure public and road safety, as well as analyze the urban environment using artificial intelligence and big data. The use of AI and big data for urban infrastructure management, security, traffic control, video surveillance, incident response, etc. In particular, the company working on such solutions says that by 2025, its portfolio includes an AI platform for traffic and security management, a video surveillance system, and applications for police and response services.

This instance demonstrates that the application of large-scale data and artificial intelligence can extend beyond corporate settings and impact the entire urban and economic framework, enhancing management effectiveness, adaptability, and prioritizing the well-being of citizens. This is particularly significant in the context of governmental institutions, public services, and public utilities.

The findings of the comparative analysis demonstrate that the implementation of big data and AI technologies has a substantial influence on the effectiveness, transparency, and controllability of state-owned enterprises in Kazakhstan.

When comparing enterprises that fully embrace digital tools with those that partially adopt or abstain from them, there is a noticeable difference in performance, decision-making speed, and asset management.

However, a quantitative assessment alone is not sufficient to fully comprehend the changes taking place. It is through the integration of comparative analysis with the case study method that we can delve deeper into the mechanisms of digital technologies.

Key materials from companies such as KEGOC, ERG, Samruk-Kazyna, and other industry enterprises provide evidence of these trends, allowing us to describe the real processes of AI and big data development, as well as the practical outcomes that cannot be fully captured through statistical comparison alone(in table1).

Table1 – Comparative Efficiency of Big Data and AI in Kazakhstan

State-Owned Enterprise	Applied Technologies	Results “Before” Digital Development	Results “After” Digital Implementation
KEGOC	Big data monitoring, predictive analytics	Low forecasting accuracy, high risk of grid overload	Increase in forecasting accuracy by 12–14%, reduction in system failures
ERG (Digital Mines)	AI algorithms, IoT sensors	Frequent downtime, high equipment load	Reduction of downtime by 10–12%, increase in productivity
Samruk-Kazyna (Group of Companies)	Analytical platforms, BI systems	High share of manual processes, limited transparency	Higher transparency of management, reduced reporting time
Center of Transport Service (Railway sector)	Big data analytics, AI-based logistics forecasting	Low planning accuracy, transport delays	Expected increase in accuracy by 9%, optimization of routing

The source was compiled based on the data [15]

The analysis of comparative data, combined with real-life examples, demonstrates that the implementation of AI and big data technologies results in a sustainable and systematic enhancement of the operational effectiveness of state-owned enterprises in Kazakhstan.

The comparative analysis reveals quantitative improvements, such as increased productivity, reduced downtime, and enhanced forecasting accuracy. The case studies explain the reasons behind these improvements and the mechanisms that facilitated them. For instance:

KEGOC has enhanced its performance by utilizing predictive analytics algorithms that detect network congestion before it occurs.

ERG has reduced equipment downtime and optimized maintenance schedules through the use of IoT sensors and AI models.

Samruk-Kazyna has improved transparency and asset management by integrating data from various subsidiaries.

This innovative approach has demonstrated that companies that have integrated AI and Big Data not only experience a numerical enhancement in their performance but also transition to a qualitatively new level of management. Unlike conventional monitoring, digital technologies enable the prediction of anomalies, the automation of decision-making processes, and the enhancement of strategic oversight.

The findings of the comparative analysis, supported by real-world examples, confirm that digital transformation is emerging as a crucial driver for enhancing the competitiveness and sustainability of state-owned enterprises in Kazakhstan.

The analysis of the outcomes of the case study and the comparative analysis has not only revealed the evolution of the influence of Big Data and AI on the performance of state-owned enterprises, but also uncovered the key obstacles and hazards that consistently impede digital transformation in Kazakhstan.

One of the primary challenges persists in the fragmented digital infrastructure, manifested by the disparity of departmental information systems, limited data interoperability, and the absence of uniform standards for data quality.

The case of Smart Data Ukimet demonstrates that successful integration of information flows is only possible when there is a unified data architecture and interdepartmental coherence.

In addition, a significant risk lies in the lack of qualified personnel with skills in working with big data, machine learning and analytical platforms. This barrier is equally widespread both in government institutions and in industrial enterprises. Another significant limitation is the institutional and legal obstacles related to data management, algorithmic accountability and transparency of decisions based on artificial intelligence.

Empirical examples have shown that government organizations should move from isolated digital projects to a single digital ecosystem that integrates government systems, business operations and external services, supported by a SWOT analysis conducted as part of the research.

Table 2 – SWOT analysis is a study of the impact of big data and artificial intelligence on the management of a public enterprise

Strengths Process significant amounts of heterogeneous information Increased transparency Automation of reports	Weaknesses Low quality of data Uniform standards for data storage Lack of qualified personnel,
Opportunities Institutional and regulatory support for advanced technologies Use of artificial intelligence for strategic planning Risk management	Threats Lack of elaboration of the legal, ethical and institutional aspects of the use of big data and artificial intelligence in the government The low level of reliability of intelligent systems on the part of employees and society

The source was compiled by the author

The analysis of strengths and weaknesses, opportunities and threats demonstrates that the use of big data processing technologies and artificial intelligence can significantly improve the management of state-owned enterprises. For the successful integration of these technologies, it is necessary to overcome internal organizational problems and take into account possible institutional and socio-ethical risks.

To achieve the maximum positive effect, it is necessary to create a sustainable system potential. This includes developing human resources, improving data quality, improving the regulatory framework, and monitoring data-driven decision-making.

Kazakhstan can effectively implement these strategies by actively improving its data infrastructure, reviewing its regulatory framework, and contributing to the development of human resources.

To sum up the findings of the research, it is evident that addressing the obstacles identified will greatly enhance the effectiveness of the digital transformation of state-owned companies. This will pave the way for a transition to a more sustainable data-driven approach to management, ensuring transparency, predictability, and increased productivity.

Conclusion

The study, which includes an overview of real-world examples of digitalization in Kazakhstan and the effectiveness of state-owned enterprises before and after the introduction of big data and artificial intelligence technologies, leads us to conclude that digital tools have significant transformational potential for the public administration system in Kazakhstan.

The practical examples considered — Smart Data Ukimet, eGov and eGov Business, digital factories of domestic companies and solutions for smart cities — demonstrate that the introduction of intelligent systems

leads to a transition from traditional bureaucratic models to data-based management, increased transparency, faster decision-making and optimization of operational processes.

The example of Smart Data Ukimet demonstrated that combining various government databases into a single analytical structure significantly improves the quality of management decisions and allows you to create predictive analytics that were previously unavailable to government agencies.

An analysis of the evolution of eGov and eGov Business digital public services shows that digitalization of procedures reduces administrative barriers, minimizes the impact of the human factor, and accelerates interaction between citizens, businesses, and the state.

Examples of digitalization of manufacturing enterprises in Kazakhstan demonstrate that the technological basis of big data and artificial intelligence can not only increase equipment productivity, but also reduce downtime, improve product quality control and optimize resource use.

Smart city solutions, such as traffic and safety monitoring systems, are an example of expanding the capabilities of municipal governments through the use of big data analytics.

The results of the comparative study showed that the introduction of Big Data and artificial intelligence leads to tangible results, which means a reduction in data processing time, improved forecasting accuracy, reduced operational risks, increased productivity and transparency.

Comparing the periods before and after implementation, it should be noted that digital tools increase the effectiveness of public administration in both strategic and operational management, and factors contributing to improving the efficiency of state-owned enterprises have been identified.

However, the analysis showed that along with the obvious advantages, there are systemic limitations that hinder the introduction of digital technologies. These include fragmentation of information systems, insufficient data integration between departments, as well as a shortage of qualified specialists in data analysis and artificial intelligence, as well as regulatory constraints in the field of data management. To promote the sustainable development of digital technologies, these issues need to be addressed comprehensively.

Thus, the comprehensive results of the study demonstrate that Kazakhstan has significant opportunities to rapidly advance digital transformation in the public administration sector. Practical examples show that the introduction of large amounts of data and artificial intelligence yields tangible results and serves as a crucial catalyst for improving management quality, optimizing operational processes, and increasing transparency and sustainability of state-owned enterprises. Continuous development of digital infrastructure, improvement of the regulatory framework and investments in human capital are important strategic prerequisites for creating a modern digital model of public administration based on data and innovation.

References

1. Johnson M. et al. Impact of big data and artificial intelligence on industry: developing a workforce roadmap for a data driven economy //Global Journal of Flexible Systems Management. – 2021. – T. 22. – №. 3. – P. 197-217.

2. Ahmad A. S. O. et al. Kazakhstan in the Global Economy: Rank, Growth, and Digital Adaptation from AI and Data Science Lens //Artificial Intelligence & Robotics Development Journal. – 2025. – P. 374-382.

3. Rawat R., Yadav R. Big data: Big data analysis, issues and challenges and technologies //IOP Conference Series: Materials Science and Engineering. – IOP Publishing, 2021. – T. 1022. – №. 1. – P. 012014.

4. Kim Y. et al. Role of state institutions in protecting the environment. Improving management system of the public services //Journal of Environmental Management & Tourism. – 2023. – T. 14. – №. 5. – P. 2379-2389.

5. Liu J. et al. Can artificial intelligence improve the energy efficiency of manufacturing companies? Evidence from China //International Journal of Environmental Research and Public Health. – 2022. – T. 19. – №. 4. – P. 2091

6. Cui J. The explore of digital leadership and green digital innovation on corporate digital transformation //Available at SSRN 5015895. – 2024.

7. Lu Y., Zhou Y. A review on the economics of artificial intelligence //Journal of Economic Surveys. – 2021. – T. 35. – №. 4. – P. 1045-1072.

8. Aliyev N. Artificial Intelligence in Digital Silk Road: Driving Innovation and Economic Transformation //Euroasia journal of social sciences & humanities. – 2025. – T. 12. – №. 1. – P. 95-102.

9. Kazakhstan's Digital Evolution: From eGov to AI Governance [Electronic resource]. Retrieved from: https://publicadministration.desa.un.org/blog/kazakhstans-digital-evolution-egov-ai-governance (accessed 01.12.2025).

10. Das A., Das S. S. E-government and entrepreneurship: online government services and the ease of starting business //Information Systems Frontiers. – 2022. – T. 24. – №. 3. – P. 1027-1039.

11. Artificial Intelligence and Digital Factories: How Industry 4.0 Elements Implemented at Enterprises in Kazakhstan [Electronic resource]. Retrieved from: https://primeminister.kz/en/news/reviews/artificial-intelligence-and-digital-factories-how-industry-4-0-elements-implemented-at-enterprises-in-kazakhstan (accessed 01.12.2025).

12. Shahi C., Sinha M. Digital transformation: challenges faced by organizations and their potential solutions //International Journal of Innovation Science. – 2021. – T. 13. – №. 1. – P. 17-33.

13. Azhari A., Raharjo T. A Systematic Literature Review on Digital Transformation Projects: Discovering Project Goals and Problems //Journal of Theoretical and Applied Information Technology. – 2023. – T. 101. – №. 21. – P. 6855-6870.

14. Stryker C. Digital silk road and surveillance technology in central Asia //Digital silk road in central Asia: Present and future. – 2021. – T. 6. – P. 17-54.

15. Alimkhanov M. Comparative Analysis of Artificial Intelligence Regulatory Approaches: The United States, European Union, Canada, China, Kazakhstan, Russia //European Union, Canada, China, Kazakhstan, Russia.(June 21, 2024). – 2024.

CURRENT TRENDS IN THE GLOBAL ECONOMY AND THE STATE OF THE GLOBAL FINANCIAL SYSTEM

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Abstract

The modern global economy is a complex, multilayered system in which developed and developing countries are constantly interacting, competing, and interdependent. This asymmetric duality, inherited from the colonial era and exacerbated by globalization, shapes the key trends and challenges facing the global community. This article examines the current state and prospects of economic interaction between developed and developing countries, analyzing the factors influencing their development, identifying areas of cooperation and conflict, and proposing directions for building a more equitable and sustainable global economic system.

The global economy is a complex system of interconnected financial, trade, and economic relations between countries. In this article, we examine the current state of the global economy, the key factors driving its development, and future prospects. Indicators of national economic globalization: The opening of national economies to the outside world is evident in all forms of their foreign economic relations. This is evidenced by indicators of national economic globalization.

The global economy remains a key aspect of the modern world, impacting the lives of millions of people worldwide. Understanding the current state and trends of the global economy is important for making informed decisions in politics, business, and society as a whole.

Keywords: Global economy, economic growth, monetary policy, sustainable growth, trade expansion, export expansion, global oil market, militarization, capital investment

Introduction

The global economy is a complex system of interconnected financial, trade, and economic relations between countries. In this article, we will examine the current state of the global economy and the global financial system, its main trends, key factors in its development, and future prospects, as well as indicators of the globalization of national economies. The opening of national economies to the outside world is evident in all forms of their foreign economic relations, as evidenced by indicators of the globalization of national economies.

The modern global economy is undergoing a structural transformation characterized by digitalization, increased protectionism, geopolitical risks, and a transition to sustainable development (ESG). The financial system is facing increasing debt burdens, a redefinition of the role of the dollar, and the development of digital currencies, while remaining volatile yet resilient to shocks.

The main trends in the global economy (2025–2026) are digitalization and AI, geopolitical fragmentation, and protectionism.

Developed countries are the center of global economic development. These countries produce three-quarters of the gross world product (GWP). The gross domestic product (GDP) of these countries serves as the primary benchmark for all other countries around them. Therefore, the most developed countries are characterized by high per capita income, which, in turn, indicates a high standard of living in these countries.

The global economy remains a key aspect of the modern world, impacting the lives of millions of people

worldwide. Understanding the current state and trends of the global economy is essential for making informed decisions in politics, business, and society as a whole.

Discussion

Global economic growth

The global economy demonstrated resilience to various exogenous and endogenous shocks in 2025, although GDP growth rates in leading economic centers slowed somewhat compared to 2024 (Table 1). Trade wars, high electricity and natural gas prices in European economies, a slowdown in the influx of migrants into the US market, and growing imbalances in the Chinese economy all exerted downward pressure on economic growth.

Table 1. GDP growth rates in the world's leading economies in 2024–2026, %

	2024 fact	2025 rating	2026 forecast
USA	2.8	1.9-2.0	18-2.1
China	5.0	4.6-4.9	4.0-5.0
Eurozone	0.8	1.1	1.0
- Germany	-0.5	0.2	0.9
- France	1.1	0.6	1.0
- Italy	0.7	0.6	0.6
United Kingdom	1.1	1.2	1.0
Japan	0.1	1.1	0.6
Canada	1.0	1.1	1.2
South Korea	2.0	1.0	2.2
India	6.5	6.5	6.4
Brazil	3.4	2.3	1.7
Russia	4.3	0.6-1.0	0.7-1.5
Mexico	1.4	0.7	1.3
Türkiye	3.3	3.2	3.2
Saudi Arabia	1.9	3.7	3.9
Indonesia	5.0	4.9	4.9
South Africa	0.5	1.1	1.3
WORLD	3.3	3.1-3.2	3.0-3.2

Sources: OECD; Institute of Economic Forecasting of the Russian Academy of Sciences; Center for Macroeconomic Analysis and Short-Term Forecasting.

The Trump Administration's foreign trade policy, based on prohibitive tariffs, trade investigations against partners, and, most importantly, trade negotiations, has proven significantly more rational, especially compared to the caricatured portrayals it has received in the global media. Despite the US import tariff reaching a record high in the post-war period in 2025 (Figure 1), global export growth remains on an upward trend and has even accelerated somewhat in recent months (Figure 2).

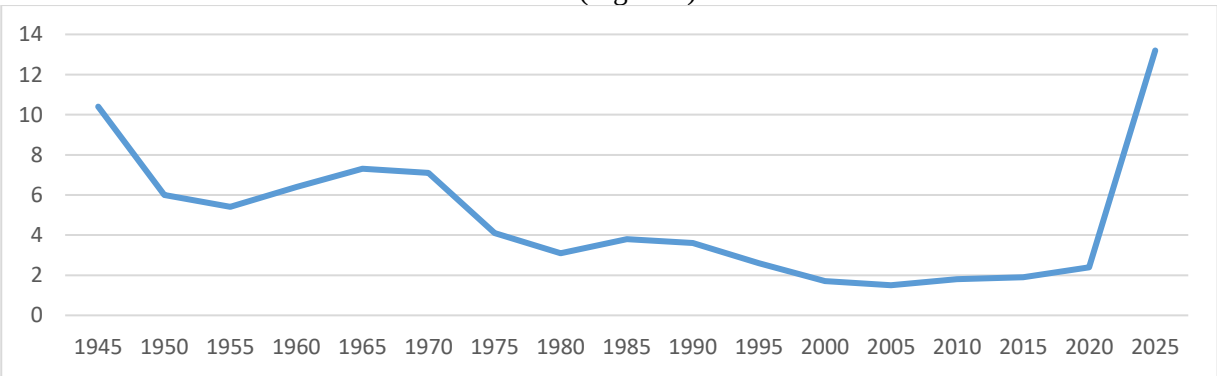


Figure 1. USA: Import Tariff Rate Dynamics 1946–2025, % Sources: Bloomberg.

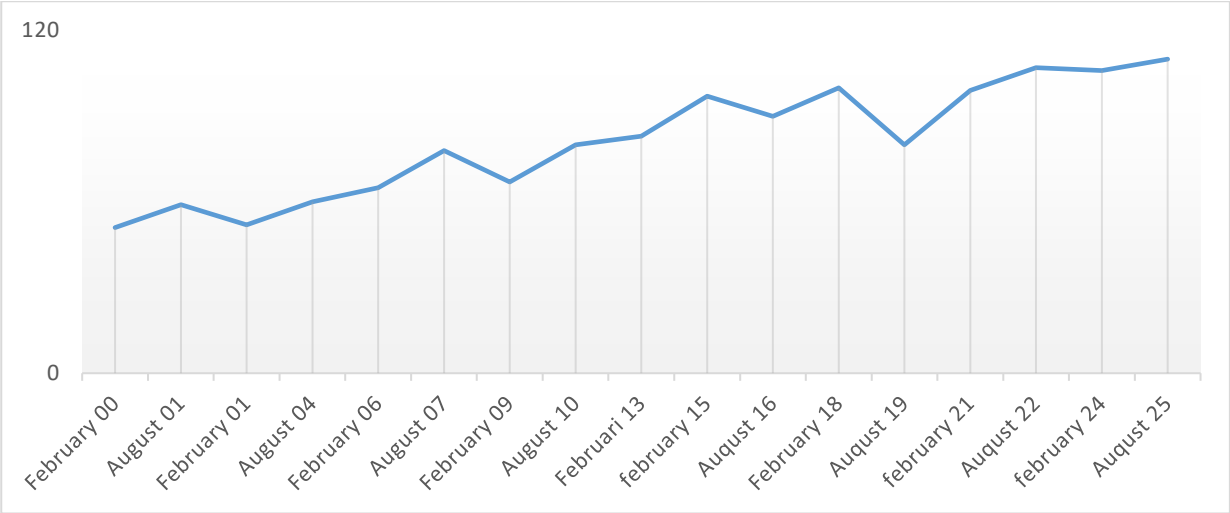


Figure 2. Dynamics of the world commodity export index in January 2000 – August 2025, 2021=100 Sources: CPB World Trade Monitor.

Loose monetary policy remains the main driver of economic growth. Central banks, particularly in China and the US, continue to pump money into the economy, despite high levels of debt across all institutional sectors. The money supply has grown particularly rapidly in recent years in China. While in 2019, broad money in China was 58% of that in the US, EU, Japan, and UK combined, this figure rose to 78% in the first nine months of 2025.

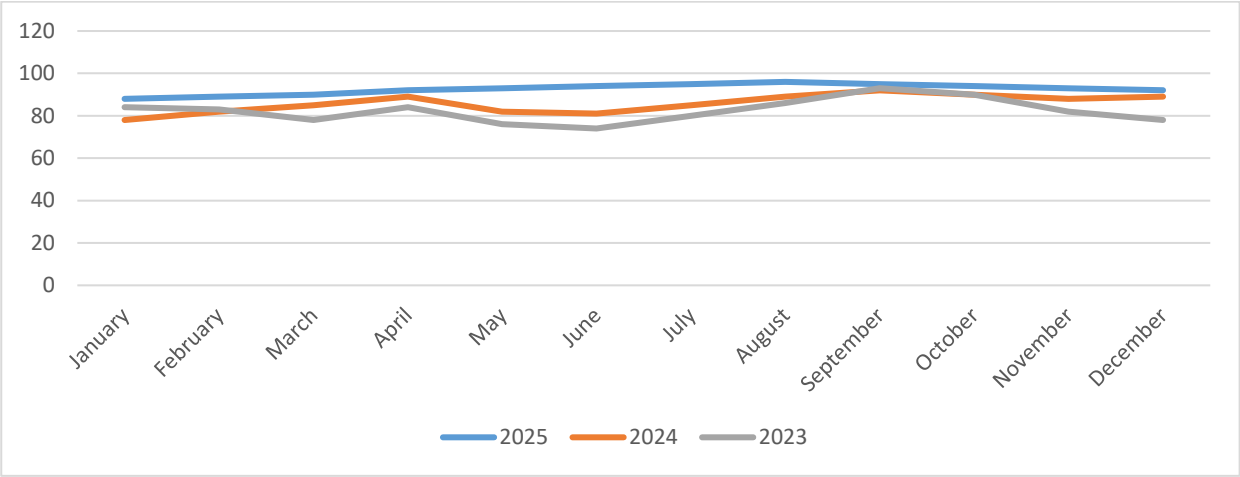


Figure 3. Monthly dynamics of the price of a barrel of Brent oil in 2023–2025, dollars per barrel Sources: World Bank.

Global economic growth is supported by declining oil prices (Figure 3), which are helping to reduce inflation, lower real-sector corporate costs, and support household spending.

Differentiation by rates and factors of economic growth

US economic growth is supported by loose monetary policy, falling oil prices, and a boom in tech investment. Some success in curbing inflation allowed the Federal Reserve to cut its key interest rate in January, September, and October 2025. By November 2025, the effective federal funds rate fell to 4.09%, 0.39 percentage points lower than at the end of 2024. The main driver of US economic growth was the boom in the artificial intelligence (AI) market. According to announced plans, US tech giants will invest nearly $400 billion in capital in 2025. The share of the "Magnificent Seven"—Apple, Microsoft, Alphabet, Amazon, Meta, Nvidia, and Tesla—in the combined market capitalization of the S&P 500 index reached a record 35–37%. Through reverse inter-industry linkages, the high-tech boom is having a strong positive impact on the dynamics of many sectors. Firstly, these are manufacturers of microchips, graphics processors, high-bandwidth memory, switching and other specialized chips, and networking equipment (February), and cables (March-April-May). Secondly, (July-August-September-October-November-December 9) are electric power companies, manufacturers of transformers and power plants, electrical equipment, industrial energy storage systems, uninterruptible power supplies, and stabilizers. Thirdly, manufacturers of cooling systems.

In the eurozone, low interest rates, labor market transformation, and a significant fiscal stimulus in Germany should support economic activity. In mid-2025, unemployment in the EU reached its lowest level in

decades. The new governing coalition in Germany, which has been in power for a year now, has not yet proposed a new strategy to guarantee the economy an exit from the two-year recession, but continues to increase public debt. Taking into account borrowing from special off-budget funds for defense and infrastructure, temporarily exempted from the debt ceiling, total government borrowing will amount to €180 billion. In the optimistic scenario, German GDP growth in 2025 will be near zero and approach 1% in 2026. High energy production costs, increased import tariffs in the US, and increasing competition from Chinese goods are preventing the chemical, steel, and automotive industries from sustaining their transition to a sustainable growth trajectory. The government can only exaggerate the risk of a direct military clash between Europe and Russia, while feeding large-scale and military industry with budget and price subsidies and shifting the brunt of the economic crisis onto households. Germany has introduced an electricity price cap for heavy industry at approximately 5 eurocents per kWh for the period 2026–2028.

China's high, albeit declining, growth rates are supported by external demand and the government's accommodative monetary policy.

Strong domestic demand, a reduced tax burden, and public investment will support high growth in India.

Many industrial exporters will come under increasing competitive pressure from Chinese companies, which, relying on comparatively low costs and rising product quality, are displacing competitors from virtually all export niches across the global economy.

Strengthening China's foreign trade expansion

The steady growth of global merchandise trade is supported almost entirely by China and developing countries (Figure 4). Eurozone exports have remained on a downward trend since the fall of 2022. Japan's exports are stagnating. US exports are growing at a slow pace, largely due to increased supplies of natural gas, oil, and petroleum products.

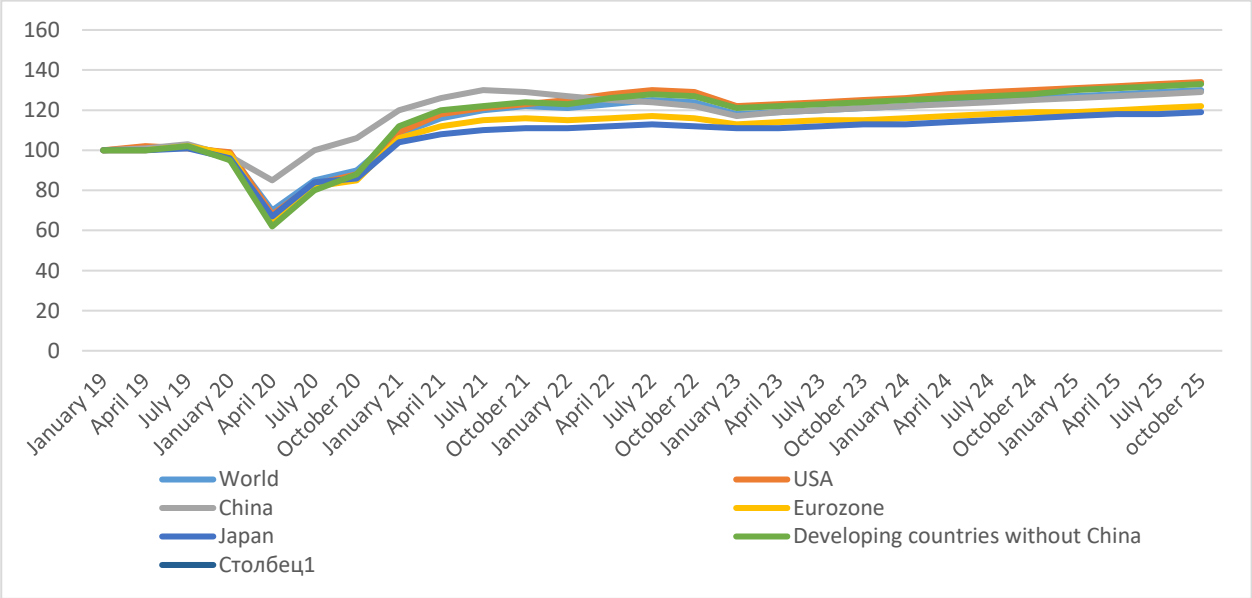


Figure 4. Dynamics of the export index by country and group of countries in January 2019 – August 2025, January 2019=100 Sources: CEI IMEMO RAS based on CPB World Trade Monitor data.

According to our estimates, China's merchandise exports in 2025 will reach a record $3.77 trillion, and the foreign trade balance, against the backdrop of stabilized imports, will amount to $1.2 trillion (Figure 5).

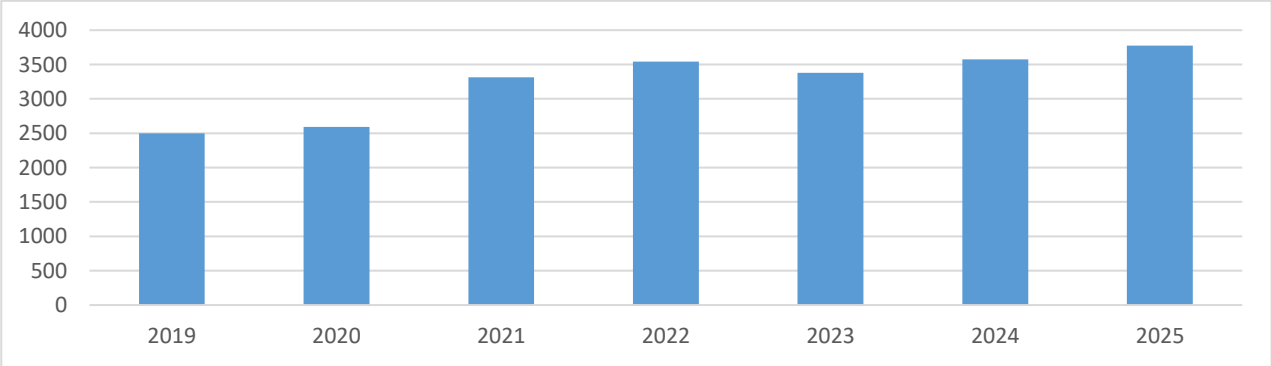


Figure 5. Dynamics of China's merchandise exports and foreign trade balance in 2019–2025, billion USD. Source: China Customs Statistics.

China's largest export markets are ASEAN, the EU, and the US (Figure 6).

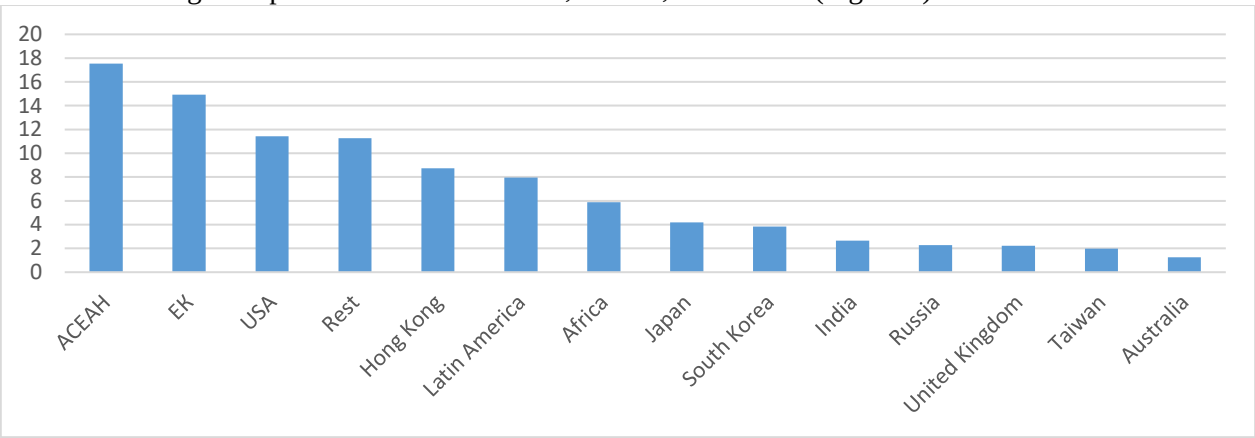


Figure 6. China: Geographic structure of merchandise exports by country and continent in January–September 2025, %

Source: PRC Customs Statistics.

Despite declarations and ideological statements about curbing China's trade expansion, EU countries will increase imports from China by 8% in 2025. The US-China trade war, which intensified in 2025, has had only a minor impact on the US trade imbalance. The US merchandise trade deficit with China is estimated to decline to $270 billion in 2025, primarily due to a reduction in imports from China (Table 2).

Table 2. Dynamics of US merchandise trade with China in 2005–2025, billion dollars

Years	Export	Import	Balance
2005	41,2	243,5	-202,3
2006	55,2	587,8	-232,6
2007	65,2	321,5	-256,3
2008	69,7	337,8	-268,1
2009	69,5	296,4	-226,9
2010	91,9	365,0	-273,1
2011	103,9	399,3	-295,4
2012	110,5	425,6	-315,1
2013	121,7	440,4	-318,7
2014	123,7	468,5	-344,8
2015	116,2	482,9	-366,7
2016	115,6	462,6	-347,0
2017	130,4	505,2	-374,8
2018	120,3	539,0	-418,7
2019	106,4	451,7	-345,3
2020	124,6	435,5	-310,9
2021	151,1	505,5	-354,4
2022	153,8	536,7	-382,9
2023	148,0	427,0	-279,0
2024	145,0	410,0	-265,0
2025	150,0	420,0	-270,0

Sources: International Trade Centre (US data)

China's ongoing large-scale export expansion is squeezing developed countries out of the global economy, both by further narrowing their export niches and by taking an ever-increasing share of their domestic consumption of final and intermediate goods. The United Kingdom, Italy, France, and the Netherlands have long had a negative balance of merchandise trade with China. In 2025, Germany's trade deficit with China increased significantly (Table 3).

Table 3. Largest European Economies: Changes in Merchandise Trade Balance with China, 2019–2025, USD Billions

	Countries	2019	2020	2021	2022	2023	2024	2025
1	EU	-182	-201	-218	-247	-228	-220	-215
2	Germany	-40	-45	-54	-63	-60	-58	-56
3	Netherlands	-15	-17	-19	-21	-20	--19	-18
4	France	-35	-39	-40	-42	-39	-37	-36
5	Italy	-22	-25	--27	-28	-26	-25	-24
6	United Kingdom	-37	-38	-38	-40	-37	-36	-35

Sources according to the Customs Statistics of the People's Republic of China (according to the Customs Statistics of the People's Republic of China)

The pressure of competing Chinese industrial exports and the increasing process of import substitution in the Chinese manufacturing industry is the main reason for the continuation of deindustrialization in developed countries.

Foreign direct investment

The United States, Brazil, Canada, and Mexico remain the main centers of attraction for foreign direct investment (Table 4). In 2025, China returned to the top priority investment markets. The concentration of foreign direct investment inflows in a limited number of countries has increased – in the first half of 2025, ten countries attracted almost two-thirds of the total flow, compared to 52% in 2024. EU Germany Netherlands France Italy 13 UK 14

Table 4. Share of countries in the total inflow of global foreign direct investment in 2024 and the first half of 2025, %

	2024		First half 2025
USA	23.4	USA	21.4
Brazil	5.0	Brazil	5.4
Canada	5.0	Canada	5.3
Australia	4.3	Australia	5.3
Mexico	3.0	Mexico	4.9
Spain	2.8	Spain	4.6
France	2.2	France	4.0
India	2.2	India	3.5
Indonesia	2.0	Indonesia	3.4
Sweden	1.9	Sweden	2.7
10 countries	51.7	10 countries	60.5
Other countries	48.3	Other countries	39.5

Sources: compiled from OECD data.

The global oil market – a structural overhang of supply over demand

The global oil market continues to experience a supply-demand imbalance (Figure 7). This imbalance crucially explains the low sensitivity of oil prices to periodic conflict flare-ups in the Middle East. Even the military bombing of Iran has failed to reverse the steady downward trend in oil prices since mid-2025. The average annual price of a barrel of Brent crude oil in 2025 is expected to be $68–$70, compared to $81 in 2024.

Figure 7. Global oil supply and demand balance in 2024–2026, million barrels per day.

Source: US Department of Energy.

The ongoing revision of OPEC+ production ceilings by countries, moving faster than the agreements reached at the end of 2024, is leading to increased oil market gluts. According to the International Energy Agency, the excess supply over demand could reach 4 million barrels per day in 2026, double the 2025 level. If this scenario materializes, oil prices could move into the $55–$60 per barrel range. However, we believe the price will remain in the $60–$70 range, gravitating toward the lower end of this range. If the US economy enters a recession, for example as a result of a bursting stock market bubble, the price of oil could briefly surge toward the $40 per barrel range.

Regional Natural Gas Markets – Structural Restructuring

In 2025, global natural gas demand is estimated to increase by 38 billion cubic meters, a significant decrease compared to 2024 (Table 3). The slowdown will be particularly noticeable in Asia-Pacific countries and North America. In Eurasia, gas demand may decline slightly. Gas demand is expected to grow more significantly in 2026, primarily driven by Asia-Pacific and Eurasia. Data centers, particularly in the United States, could become a major new source of gas demand, or more precisely, gas-powered generation.

Table 5. Natural Gas Demand Growth by Region and Country, billion cubic meters

	2024 fact	2025 rating	2026 forecast
Africa	0	3	5
Asia Pacific Region	54	6	48
- China	30	5	26
Central and South America	5	0	-2
Eurasia	27	-6	19
- Russia	26	-7	16
Europe	4	15	-12
Middle East	6	11	24
North America	20	8	4
- USA	18	6	3
WORLD	**116**	**38**	**85**

Sources: according to the International Energy Agency.

Natural gas price volatility in the US has increased amid a generally upward trend in gas prices (Table 5). Gas prices in Europe and Asia-Pacific markets have converged to virtually the same level. There are growing signs that a supply overhang is forming in gas markets, which could push gas prices down. Amid sluggish gas demand growth, the market's structural restructuring in favor of LNG continues at an accelerated pace. A large number of LNG export projects are expected to come on stream in 2026–2028, primarily from the US and Qatar.

Table 5. Monthly dynamics of natural gas prices in the USA, Europe and Japan in January 2019 – October 2025, dollars per 1 million BTU

Year / month	USA (Henry Hub)	Europe (TTF/spot)	Japan (LNG, JKM)
2019 Jan	3,1	7,8	10,2
2019 Apr	2,6	5,2	8,3
2019 Jul	2,3	4,4	7,4
2019 Oct	2,5	5,0	8,0
2020 Jan	2,0	3,7	7,0
2020 Apr	1,8	2,5	6,4
2020 Jul	1,7	2,9	6,8
2020 Oct	2,9	4,6	7,5
2021 Jan	5,4	7,0	9,6
2021 Apr	2,8	8,2	10,4
2021 Jul	3,8	13,0	14,2
2021 Oct	5,6	28,0	17,1
2022 Jan	4,4	31,0	18,7
2022 Apr	6,9	35,5	20,2
2022 Jul	7,5	42,0	23,1
2022 Oct	6,0	39,0	18,6
2023 Jan	3,5	18,0	14,9
2023 Apr	2,2	13,5	13,0
2023 Jul	2,7	10,8	12,3
2023 Oct	3,2	12,0	13,1
2024 Jan	2,8	10,5	12,5
2024 Apr	2,4	9,7	11,8
2024 Jul	2,9	9,9	11,6
2024 Oct	3,2	10,1	11,9
2025 Jan	3,0	10,3	12,1
2025 Apr	3,1	10,5	12,3
2025 Jul	3,3	10,7	12,5
2025 Oct	3,5	11,0	12,8

Sources: World Bank.

In 2020, prices fell sharply due to the pandemic-related decline in demand. In 2021–2022, a price explosion was observed, particularly in Europe (TTF gas exceeded $40/MMBtu in the summer of 2022). Table 5 shows that the price peak in Europe occurred in the second half of 2022, reaching $50/MMBtu (energy crisis). TTF (Europe) rose sharply in 2021–2022 due to the energy crisis and reduced supplies from Russia. Since 2023, prices have normalized and returned to the medium-term range ($8–12 for Europe, $2.5–3.5 for the US). In the US, prices were significantly lower due to domestic production (shale gas). In Japan, prices follow global LNG prices with a lag of approximately 1 quarter. The 2025 forecast assumes moderate market stabilization at $9–13/MMBtu. From 2023, prices will normalize and return to the medium-term range ($8–12 for Europe, $2.5–3.5 for the US).

European and US sanctions against Russian companies are significantly influencing the transformation of gas markets. At the end of 2025, the EU and the US entered the final stages of ousting Russian natural gas from the European market. The 19th round of European sanctions has opened the door for natural gas importers to terminate long-term contracts with Russian suppliers, citing force majeure.

Militarization of economic growth

Total global military spending in 2025 is estimated at $2.75 trillion. After record highs in 2023 and 2024, global military spending in 2025 increased by 2.4% (Figure 8).

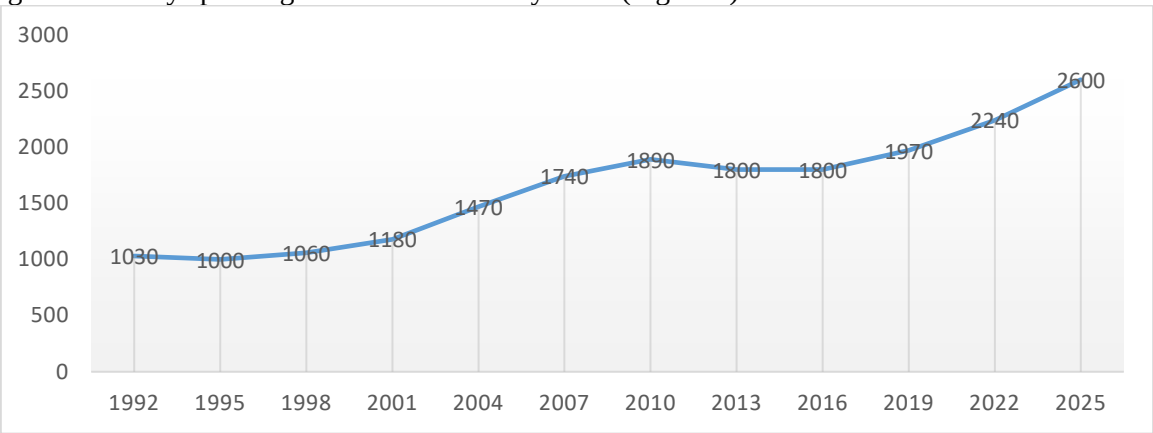


Figure 8. World: Military Spending Dynamics 1992–2025, $ billion

Source: SIPRI

After the end of the Cold War (early 1990s), spending fell to approximately $1 trillion. Since the early 2000s, military spending has gradually increased due to terrorist threats and the wars in Afghanistan and Iraq. After 2015, due to increased tensions (NATO-Russia, Middle East, Indo-Pacific), military spending began to rise again, and from 2022-2025, there was a significant jump due to the conflict in Ukraine and increased defense budgets in NATO, the EU, and Asia.

As can be seen, in recent years, an increasing number of countries have joined the arms race. While in 2019, military spending relative to GDP was within 2-3% in 19 countries, by 2024, this figure had risen to 34 (Table 4).

Table 4. Distribution of countries by military spending to GDP ratio in 2019 and 2024, %

% in GDP	Number of countries	
	2019	2024
>5	5	8
3–5	16	15
2–3	19	34
1–2	69	49
<1	39	42
Unweighted average	1.78	2.20

The leaders in terms of increasing military spending relative to GDP in 2019–2024 were European and African countries, as well as Azerbaijan (Figure 9)

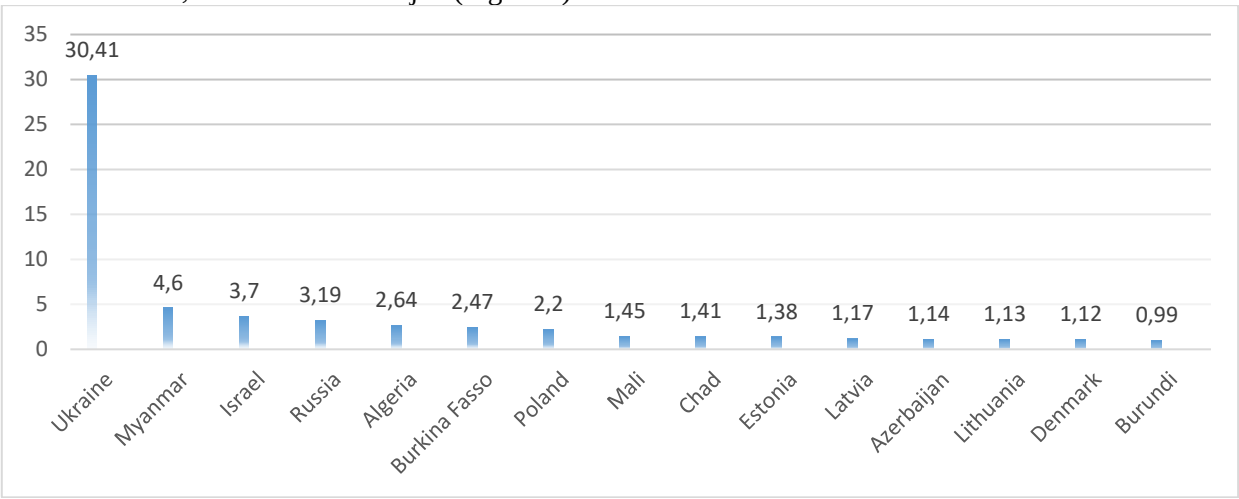


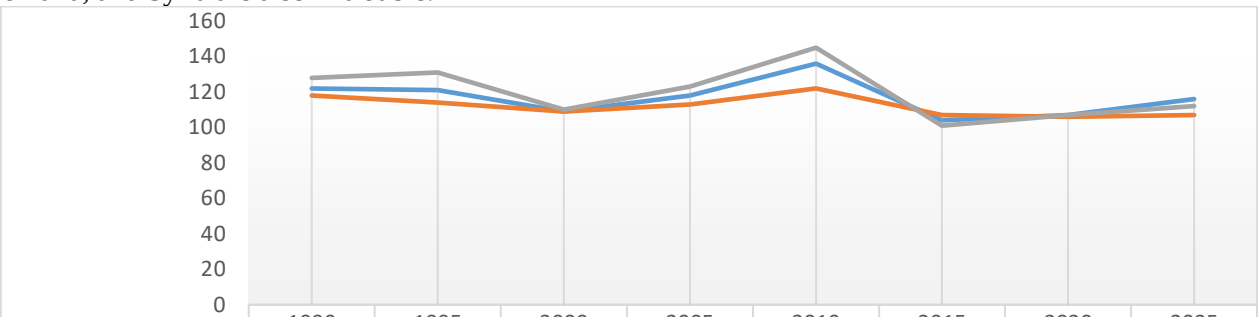
Figure 9. Countries with the largest increase in military spending as a share of GDP in 2019–2024, percentage points.

Source: SIPRI data.

In the summer of 2025, NATO countries announced a new mandatory defense spending target of 3.5% of GDP by 2035, along with a commitment to additional spending on defense-related infrastructure equal to 1.5% of GDP. In 2024, NATO member states' military spending totaled 2% of GDP, or approximately $1.5 trillion. According to SIPRI estimates, to achieve the stated 5% target, NATO countries will have to increase defense spending by $2.7 trillion, reaching $4.2 trillion. The challenge lies not only in finding sources for such colossal resources, but also in the ability of NATO economies to effectively absorb them. In 2025, only Poland, Lithuania, and Latvia will meet the 3.5% target. Four other countries—Estonia, Norway, Denmark, and the United States—will have military spending exceeding 3% of GDP.

Global food problem

Food prices will rise again in 2025, although they have not returned to the record levels of 2022 (Figure 10). Meat products are driving the price increases, while grain prices continue to decline. According to the UN, critical food security situations have developed in Sudan, South Sudan, Mali, Haiti, and the occupied Palestinian territories. Yemen, the Democratic Republic of the Congo, Myanmar, Nigeria, Burkina Faso, Chad, Somalia, and Syria are also in trouble.



	1990	1995	2000	2005	2010	2015	2020	2025
Food (total)	122	121	109	118	136	104	107	116
Meat products	118	114	109	113	122	107	106	107
Cereal crops	128	131	110	123	145	101	107	112

Figure 10. Dynamics of the real food price index in 1990–2025, 2014 2016 = 100

Sources: Food and Agriculture Organization of the United Nations (FAO).

The data in Figure 10 are presented in real prices (adjusted for average global inflation, base 2014–2016 = 100). The figure shows that grain crops are showing the most volatile dynamics (spikes in 2008 and 2022), while meat production is growing more smoothly, with significant growth occurring in 2020–2022 due to rising feed and logistics costs. Price indicators for the period 2023–2025 indicate a gradual return to pre-crisis levels.

Results of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP30))

The global climate agenda has fundamentally changed. In its final communiqué, COP30 did not even outline its position on the future use of fossil fuels and deforestation. Predictably, the illusion that China would take the lead on the global climate agenda was not realized. Acting in full accordance with its traditions, China, as always, focused on advancing its own national interests. Overall, COP30 marked a shift in the focus of international efforts from mitigation, or reducing absolute greenhouse gas emissions, to adaptation to climate change. A tripling of resources allocated for adaptation by 2035 was declared.

The issue of restrictions on international trade was included on the COP agenda, primarily at the initiative of China. The communiqué noted that measures to combat climate change "should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade."

Representatives from 60 Fortune 100 companies and banks, including Google, Occidental Petroleum, General Motors, and Citigroup, participated in COP30. ExxonMobil, the world's largest private oil and gas company, participated in preliminary work prior to the conference. The private sector continues to increase investment in green energy. In the US, employment growth in new energy sectors is three times higher than the overall economy.

Turkey will host COP31 in 2026.

Risks in 2026: The practical implementation of US tariff policy has demonstrated that the Trump administration, despite political declarations, is demonstrating a willingness to reach rational compromises with US trading partners, especially when faced with compelling counterarguments, as in the case of China. In this regard, the level of uncertainty in the global economy has significantly decreased. Economic agents are also gaining additional confidence from the persistent downward trend in global oil prices, driven by the structural

overhang of oil supply over demand, which will become even more significant in 2026. Growing European military spending will also support economic growth, especially in the short term.

The main economic risks in 2026 are, firstly, the bursting of the Big Tech bubble in the stock market; secondly, the delayed effects of trade wars; and thirdly, a wave of bankruptcies among debt-laden real-sector companies and financial institutions.

Technology companies are investing virtually all of their free cash flow in capital investments. It is unclear whether these projects will be able to generate adequate returns. To generate sufficient returns for investors by 2030, revenues must increase 100-fold. Market players are fully aware that they are trapped in a game-theoretic trap and could lose the race to AI. As Google co-founder L. Page stated, "I'm willing to go bankrupt rather than lose this race."

All three major centers of global economic activity are overburdened with debt (Figure 11). The debt ratio to GDP is particularly high in the eurozone. Real-sector corporate debt in China exceeds 138% of GDP, while in the eurozone it exceeds 105% of GDP. This critical debt burden has sharply increased the financial fragility of the economy.

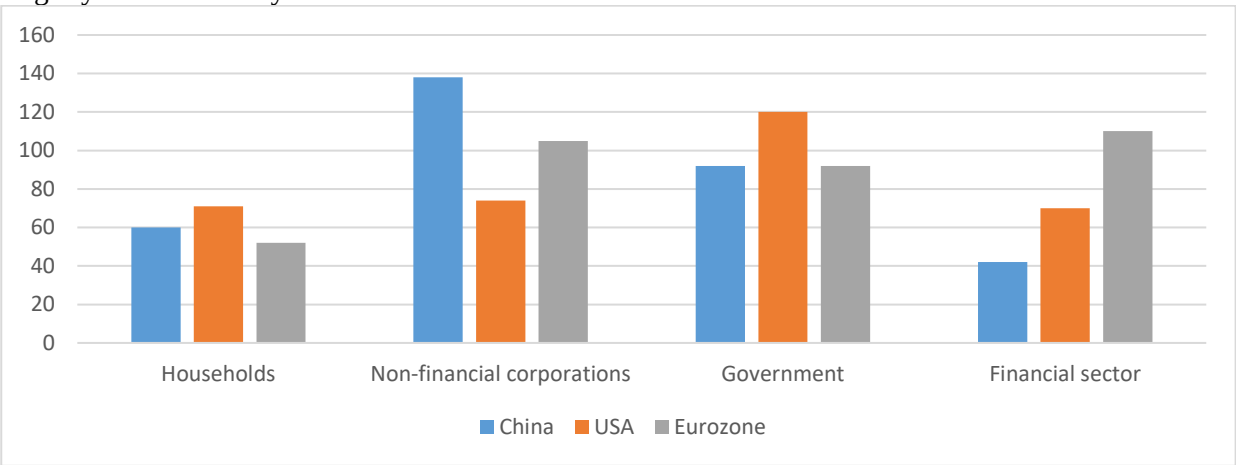


Figure 11. Eurozone, China, and the US: Institutional sector debt as a percentage of GDP in 2024, %

Sources: Institute of International Finance.

In 2026, China's economy may slow slightly due to exhaustion of opportunities to stimulate economic growth through foreign trade expansion. This is especially true if China's trade partners decide to strengthen protectionist policies toward imports from China.

Table 5. Main US Federal Budget Expenditure Items in Fiscal Years 2025–2027, $ billion (estimates)

	2025	2026	2027
Key Health Programs	1957	2047	2169
Social Security	1572	1664	1761
Interest payments on government debt	952	1010	1075
Military spending	862	1010	1050
Pensions for federal employees and military personnel, veterans' programs	442	466	491
Social payments and benefits	410	387	381

Sources: Congressional Budget Office; White House Fiscal-Year-2026-Discretionary-Budget Request.pdf. May 2, 2025. URL:https://www.whitehouse.gov/wp-content/uploads/2025/05/Fiscal_Year-2026-Discretionary-Budget-Request.pdf.

The main systemic risk to the US and global economies—the out-of-control growth of federal government debt—continues to grow. Annual interest payments on the debt have reached $1 trillion per year and are the third-largest federal budget expenditure item after the core healthcare and social security programs (Table 5). Debt servicing accounts for 3.2% of GDP, and if current trends continue, this figure will exceed 4% of gross domestic product by 2035 (Table 6). These estimates do not take into account the significant increase in the national debt and its servicing costs envisaged in the Budget Act for Fiscal Year 2026.

Table 6. Dynamics of the US federal government debt and interest payments on its servicing, % of GDP

	2024	2025	2026	2027	2028	2030	2031	2033	2034	2035
US Federal Government Debt as a % of GDP	99	100	102	104	106	110	112	116	118	120
Interest payment for its servicing, % of GDP	3,1	3,2	3,3	3,3	3,4	3,6	3,7	4,0	4,1	4,2

Sources: Congressional Budget Office.

According to CBO forecasts, federal government debt will increase from approximately 99% of GDP in 2024 to approximately 120% by 2035. Interest expenses, one of the fastest-growing components of the US budget, will be comparable to budget expenditures by 2030. The growth in interest payments is driven by the

persistence of the federal budget deficit, the Federal Reserve's rate hikes in 2022–2024, and the increase in debt obligations.

The intensifying struggle over the budget, its revenue and expenditure structure, monetary policy, and debt borrowing policies will further increase the level of political and social conflict in the US. A fierce battle is expected over the candidacy of a new Federal Reserve Chairman. The growing systemic risk in the US economy, which is provoking an intensification of domestic political infighting, will inevitably be reflected in US foreign economic policy.

Conclusion

In our view, in the short term, both developed and developing economies will experiment with existing instruments, subject to limitations in the political process (the impossibility of creating a single regulator in the US or the extremely slow pace of decision-making in the Eurozone, which requires consensus from all member states). The general trend will be increased coordination between regulators at the country, regional, and global levels, with attempts to unify regulatory principles and methods across various segments of the financial industry. Central banks or specialized mega-regulators will play a key role in both developing and implementing these changes. The costs of building a new system will be quite high for both regulators and the financial industry.

Current trends in the global financial situation are associated with the relative strengthening of leading global currencies (primarily the US dollar) and the outflow of financial resources from emerging markets.

The future of the global economy depends on how successfully developed and developing countries can find common ground and cooperate in addressing global challenges. Building a more equitable and sustainable system requires rethinking traditional development models and revising the rules of the global economy. Only then can prosperity and well-being be ensured for all countries and peoples.

References

1. Orucov M.M, Ibrahimova S.R. New trends in the development of the, global economy. XVII international scientific conference Stocholm, Sweden. 12-13.08.2025. ISBN 978-91-65424-33-3 DOI https://doi.org/10.5281/ zenodo.16892861

2. Orucov M.M, Ibrahimova S.R. **U.S**. Protectionism against China's mercantilism. XVI International Scientific and Practical Conference August 05-06, 2025, Toronto. Canada. SBN 978-91-65424-32-6 DOI https://doi.org/10.5281/
zenodo.16813182

3. Orucov M.M, Ibrahimova S.R Price mechanisms of the digital economy: divide et impera. III international scientific conference. Sydney. Australia. 31.07-01.08.2025. ISBN 978-92-44514-61-0 DOI
https://doi.org/10.5281/zenodo.16751595

4. Orucov M.M, Ibrahimova S.R. Wetting of contradictions between China and the prospects for bilateral economic relations. III international scientific conference. Seoul. South Korea. August 07-08. 2025. ISBN 978-92-44514-62-7 DOI https://doi.org/10.5281/zenodo.16871369

5. Orucov M.M, Ibrahimova S.R. Analysis of the current state of the world economy and the financial-monetary system and forecast for 2026. XX international scientific conference. Toronto. Canada 22-23.01.2026

6. Orucov M.M. Dünya iqtisadiyyatında baş verən dəyişikliklər fonunda Azərbaycan iqtisadiyyatının mövcud vəziyyəti. OYU-nin Elmi və Pedaqoji xəbərləri, 2018, № 50, ISSN: 1682-9123 DOI: 10.0318/OYU.2023735552

7. Orucov M.M. Milli iqtisadiyyatın müasir inkişaf modeli, OYU-nin Elmi və Pedaqoji xəbərləri, 2020, № 54, ISSN: 1682-9123

8. Orucov M.M. Dünya iqtisadiyyatının uzunmüddətli proqnozlaşdırılması parametrləri. OYU-nin Elmi və Pedaqoji xəbərləri, 2024, № 63, ISSN: 1682-9123

9. Ibrahimova S.R. Fragmentation of global social capital. XX international scientific conference. Paris. France. 19-20. 2025, ISBN 978-91-65424-34-0 DOI https://doi.org/10.5281/zenodo.17005326

10. Ibrahimova S.R. New trends in the development of the, global economy. XVII international scientific conference Stocholm, Sweden. 12-13.08.2025, ISBN 978-91-65424-33-3 DOI https://doi.org/10.5281/zenodo.16892861

11. Ibrahimova S.R. Public investment and global economic resilience. II international scientific conference. Lisbon. Portugal. 08-09.07.2025, ISBN 978-91-65424-28-9 DOI https://doi.org/10.5281/ zenodo.15861641

12. Orucov M.M, World trade in the conditions of the globalization crisis, XX international scientific conference. Philadelphia. USA. 12-13.06.2025, ISBN 978-92-44514-58-0 DOI https://doi.org/10.5281/zenodo.15691366

13. Orucov M.M, Azerbaijan's economy in the new international realities, II international scientific conference. Helsinki. Finland. 29-30.05.2025, ISBN 978-92-44514-56-6 DOI https://doi.org/10.5281/zenodo.15622437

14. Orucov M.M. Ibrahimova S.R., Mechanisms of international financial relations in the conditions of the globalization crisis, **I** international scientific conference. Lisbon. Portugal. 22-25. 2025, ISBN 978-91-65424-17-3 DOI https://doi.org/10.5281/zenodo.15305608

15. Orucov M.M. Formation of investment climate in the oil and gas industry of Azerbaijan and its impact of the development of the non-oil sector. **I** international scientific conference**. Singapore. Singapore. 01-02.04.2025.** ISBN 978-91-65424-14-2 DOI https://doi.org/10.5281/zenodo.15165189

16. Orucov M.M. Application of money supply targeting regime within the framework of monetary policy, I international scientific conference. Seoul. South Korea. 06-07.03.2025, ISBN 978-92-44514-44-3 DOI https://doi.org/10.5281/ zenodo.15020702

17. Orucov M.M. Forecast of global economy development, I international scientific conference. Marseille. France. 20-21.02.2025, ISBN 978-92-44514-42-9 DOI https://doi.org/10.5281/ zenodo.14932296

18. Orucov M.M. Elements of credit policy and stimulation of credit investments in the real economy, Sciences of Europe (Praha, Czech Republic) No 153 (2024, ISSN 3162-2364

19. Orucov M.M. Diversification of economy the Republics Azerbaijan on the base sustainable development of non-oil sector, XIV international scientific conference. Toronto. Canada. 14-15.11.2024, ISBN 978-92-44514-28-3 DOI https://doi.org/10.5281/ zenodo.14199182

20. Orucov M.M. Analysis of foreign investment in Azerbaijani economy and directions to increase, XVII International Scientific Conference. Dortmund. Germany. 07-08.11.2024, ISBN 978-92-44514-27-6 DOI https://doi.org/10.5281/ zenodo.14136799

21. Orucov M.M, Ibrahimova S.R. Reserve currencies: Are changes possible? XXI International Scientific and Practical Conference November 4-5, 2025, Paris. ISBN 978-91-65424-45-6 DOI https://doi.org/10.5281/ zenodo.17574617

22. Orucov M.M, Ibrahimova S.R. Entrenchment of neo-protectionism in global economy of XXI century**.** III international scientific conference. Helsinki. Finland. 14-15.08.2025. ISBN 978-92-44514-63-4 DOI https://doi.org/10.5281/zenodo.16912767

23. Orucov M.M, Ibrahimova S.R. Global dominance of dollar: theory and prospects. V International Scientific Conference. Singapore. 27-28.01.2026.

THEORETICAL ASPECTS OF PROPERTY INSURANCE

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Abstract

The insurance market is an integral part of the financial system and plays a crucial role in maintaining economic stability. Among the various types of insurance, property insurance is one of the oldest and most essential, as it provides a mechanism for managing risks and compensating for losses resulting from unexpected events. This paper aims to explore the theoretical foundations of property insurance, highlight its economic and social significance, and analyze the subject through different scientific perspectives. The findings indicate that property insurance is not only a method of compensating damages but also a tool for distributing risk and supporting sustainable economic development.

Keywords: insurance market, property insurance, risk management, economic stability, insurance functions.

Introduction

The insurance market is widely recognized as one of the key stabilizing mechanisms of the financial system, as it enables the redistribution and management of risks among various economic agents. By pooling individual risks and transforming them into collective responsibility, insurance reduces uncertainty and supports economic continuity. Within this system, property insurance holds a particularly important position because it provides direct protection for tangible assets, which constitute the material foundation of economic activity.

In modern economies, property is closely associated with production processes, investment decisions, and household welfare. Industrial facilities, commercial buildings, residential property, and infrastructure assets are essential for generating income and ensuring social well-being. Damage or loss of such assets can lead to significant financial disruptions, making property insurance a strategically important tool for safeguarding economic stability. As a result, the demand for property insurance increases alongside economic development and the expansion of private ownership.

Historically, insurance practices originated as informal arrangements based on mutual assistance and risk-sharing within communities. Over time, these practices evolved into structured institutional systems. The development of insurance relations in Europe during the seventeenth century, particularly in England, marked a turning point in the formalization of insurance activities. The establishment of Lloyd's of London in the eighteenth century further contributed to the professionalization of insurance services and played a crucial role in the expansion of property insurance as a distinct branch of the insurance industry.

In contemporary conditions, property insurance is not limited to compensating losses after insured events. It also performs preventive and regulatory functions by encouraging risk assessment, loss prevention, and responsible property management. By transferring risks from individuals and enterprises to insurance institutions, property insurance reduces economic uncertainty and supports long-term planning and investment decisions. Therefore, the analysis of the theoretical foundations of property insurance remains highly relevant for understanding its role in ensuring economic stability and strengthening social protection mechanisms.

Literature review

Academic literature on property insurance offers diverse theoretical interpretations that explain its economic, social, and legal dimensions. One of the most widely discussed approaches is the theory of loss compensation, which views insurance as a financial mechanism designed to restore economic balance following random adverse events. According to this perspective, insurance operates through collective risk-sharing, enabling individuals and businesses to protect their capital from unexpected losses (Knyazeva, 2003; Wüthrich & Merz, 2013).

Another group of studies emphasizes insurance as a system aimed at addressing uncertain needs rather than merely compensating quantifiable losses. Within this framework, insurance payments are interpreted as responses to the level of need generated by an insured event. This approach highlights the social role of insurance and its function in maintaining economic security for policyholders, particularly in situations where losses cannot be precisely measured (Kristó et al., 2024; Fedorovych, 2024).

Recent research increasingly focuses on the preventive function of property insurance. Scholars argue that insurance contracts create incentives for risk-reducing behavior by encouraging policyholders to comply with safety standards and invest in protective measures. This perspective underlines the contribution of

property insurance to sustainable risk management and the reduction of potential losses before they occur (Déroche, 2023).

Legal studies place particular emphasis on the concept of insurable interest as a fundamental condition for the validity of insurance contracts. The evolution of this concept reflects a gradual shift from strict legal formalism toward a broader understanding of value protection and economic interest within insurance relationships. Such interpretations expand the scope of property insurance and enhance its adaptability to modern economic realities (Battakhov et al., 2023; Mariyam, 2025; Cao, 2025).

Research methodology

This research employs a qualitative methodological approach based on theoretical analysis and comparative review of academic and legal sources. The study examines relevant books, peer-reviewed journal articles, and regulatory materials related to property insurance in order to identify key theoretical concepts and dominant interpretative frameworks.

Analytical and logical reasoning methods are used to synthesize different viewpoints and evaluate their relevance under contemporary economic conditions. Special attention is given to the applicability of established insurance theories in emerging and transition economies, where market institutions are still developing and risk exposure remains relatively high.

In addition, selected national studies and analytical reports concerning the Azerbaijani insurance market are reviewed to connect general theoretical insights with local economic realities. This approach allows for a comprehensive examination of property insurance without relying on primary empirical data, while still maintaining relevance to practical economic conditions.

Results and discussion

The analysis demonstrates that property insurance performs several interrelated economic functions. By mitigating financial risks associated with property loss or damage, it supports business continuity and contributes to the stability of capital circulation. Enterprises that maintain adequate insurance coverage are better equipped to recover from unexpected losses, minimize production disruptions, and preserve their financial sustainability.

From a social perspective, property insurance enhances household financial security by reducing the economic impact of adverse events. This function becomes particularly significant in cases involving natural disasters, accidents, or other large-scale risks that threaten living standards and social stability. Insurance compensation helps households restore damaged property and avoid long-term financial distress.

In the context of Azerbaijan, property insurance plays an increasingly important role in strengthening the entrepreneurial environment. Local studies indicate that insurance mechanisms contribute to reducing production interruptions and protecting investments, thereby supporting economic resilience and business confidence (İbrahimov et al., 2017; Khudiyev, 2015).

Moreover, the inclusion of preventive requirements within insurance contracts encourages property owners to adopt risk-reducing measures, such as compliance with safety regulations and the implementation of protective technologies. This not only lowers potential losses but also fosters a culture of responsibility, risk awareness, and long-term economic planning.

Conclusion

The expanded analysis confirms that property insurance represents more than a simple mechanism for financial compensation. It functions as a vital instrument for risk management, capital preservation, and overall economic stabilization. Through the redistribution of risks and the promotion of preventive behavior, property insurance contributes to sustainable economic development and social security.

Its role is particularly important for economies that seek to strengthen market institutions and protect both business interests and household welfare. In the case of Azerbaijan, further development of property insurance can enhance economic resilience and increase confidence among economic agents.

Therefore, continued theoretical research and practical improvements in the field of property insurance remain both relevant and necessary to ensure its effective integration into the broader financial system.

References

1. Knyazeva, E. G. (2003). *Main theories of insurance and their modern interpretations*. Journal of New Economy, (7), 16–20.

2. Wuthrich, M. V., & Merz, M. (2013). *Financial Modeling, Actuarial Valuation and Solvency in Insurance*. Springer-Verlag.

3. Kristo, J., et al. (2024). *What drives property insurance demand in Croatia?* Zagreb International Review of Economics and Business, 27(1), 155–176.

4. Fedorovych, I. (2024). *Analysis of the provision of insurance services in property insurance*. Ekonomichnyy Analiz, 34(1).

5. Deroche, M.-S. (2023). *An insurer's perspective on the knowns and unknowns in natural hazard risk modelling*. Natural Hazards and Earth System Sciences, 23, 251–259.

6. Battakhov, P. P., Ovchinnikova, Y. S., & Moturenko, S. M. (2023). *The concept of insurable interest in civil law: Key issues of theory and practice*. RUDN Journal of Law, 27(2), 439–452.

7. Mariyam, S. (2025). *The urgency of the principle of interest in insurance agreements*. PAMALI: Pattimura Magister Law Review, 5(2), 230–243.

8. Cao, S. (2025). *The evolution of insurable interest in law and practice: A comparative analysis of marine and life insurance*. Law and Economy, 4(2), 44–60.

9. Ibrahimov, E. R., Huseynov, M. J., Salahov, E. A., & Abbasova, Y. E. (2017). *Insurance* (Textbook). Baku.

10. Khudiyev, N. (2015). *Fundamentals of Insurance* (Coursebook). Baku.

11. Abbasova, L. (2019). *Compulsory insurance of real estate: Problems and solutions* (Article). Baku.

12. Mammadov, M. (2012). *Compulsory insurance of real estate is a requirement of the time*. Yeni Azerbaijan Newspaper, p. 6.

Geographical sciences

ECOLOGICAL STATUS OF THE HIGH MOUNTAINS AND ITS ECOGEOGRAPHIC REGIONATION

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Abstract

The article examines the forms of anthropogenic impact on the mountainous landscape of Nakhchivan Autonomous Republic (cattle grazing. mowing of subalpine meadows, temporary and permanent settlement, construction of defensive fortifications, etc.) is widely characterized. The location of summer pastures on the territory and landscape disturbances that occur during grazing of alpine and subalpine meadows without observing agrotechnical rules and the reasons for their elimination are also indicated. Military defensive fortifications, irregular grazing, etc., caused by the formation of soil cover and the erosion processes occurring in it. In addition to the indication, the ways to eliminate them were noted. An assessment of the ecological state of the highlands exposed to anthropogenic impact was carried out, ecogeographic zoning was carried out and a map-scheme was compiled.

Keywords: Ecological situation, ecogeographic zoning, climate action, Erosion

The high interdependence of natural components in the area requires more careful management to maintain ecological balance. The impact of climate action is being closely monitored in relation to the area's location. The primary landscape indicators—soil, water, and vegetation—develop in close interaction with one another.

The rich nature and landscape of the highlands have led most of the population to settle or temporarily reside in nearby areas. This settlement is mainly due to the strong feed base for livestock development here. Even from other mid-mountain and plain districts of the Autonomous Republic, they come here to use it as a summer pasture. The alpine meadows located in the high mountains of the Alıncaçay, Cəhriçay, Küküçay, Naxçıvançay, Vənəndçay, and Kotamçay rivers are extensively used as summer pastures (4). During the summer grazing season, which lasts up to four months, and during the drives to and from the pastures (the transhumance), the natural landscape suffers considerable damage. Because livestock herders often fail to properly adhere to agrotechnical rules during grazing, they do not practice rotational grazing. As a result, this leads to the eradication of some plants that form the forage base of alpine meadows and a reduction in the diversity of plant communities.

Figure 1. Qanlıgöl Plateau in the Küküçay Basin

For a period of 5-6 months, the local population engaged in livestock farming here engages in both grazing and harvesting winter fodder from the subalpine meadows. However, because certain rules are not followed when mowing the subalpine meadows for winter fodder, a gradual decline in the plant species composition is being observed in the meadows. Harvesting before plants reach the seed stage means that seed-propagated plants cannot germinate in the following vegetation period. This also leads to a gradual reduction in the feed unit. Also, grazing the area after the harvest creates ecological stress by causing the animals to consume the plants' seed and corm systems. This is because from May to October, herds of livestock and black cattle can be seen everywhere in the high mountains of the region (9).

Unregulated grazing causes significant damage to the landscape. Every farmer and private farm tries to make the most of the land they lease. As a result, the vegetation on the pastures thins out, and erosion begins. The vast, undefined nature of the area makes it difficult to control the livestock. The animals, however, use the land as they please. The most affected areas are the areas around the animals' bedding places (arxac), where only unused weeds, thistles, and thorns are found among the vegetation (3).

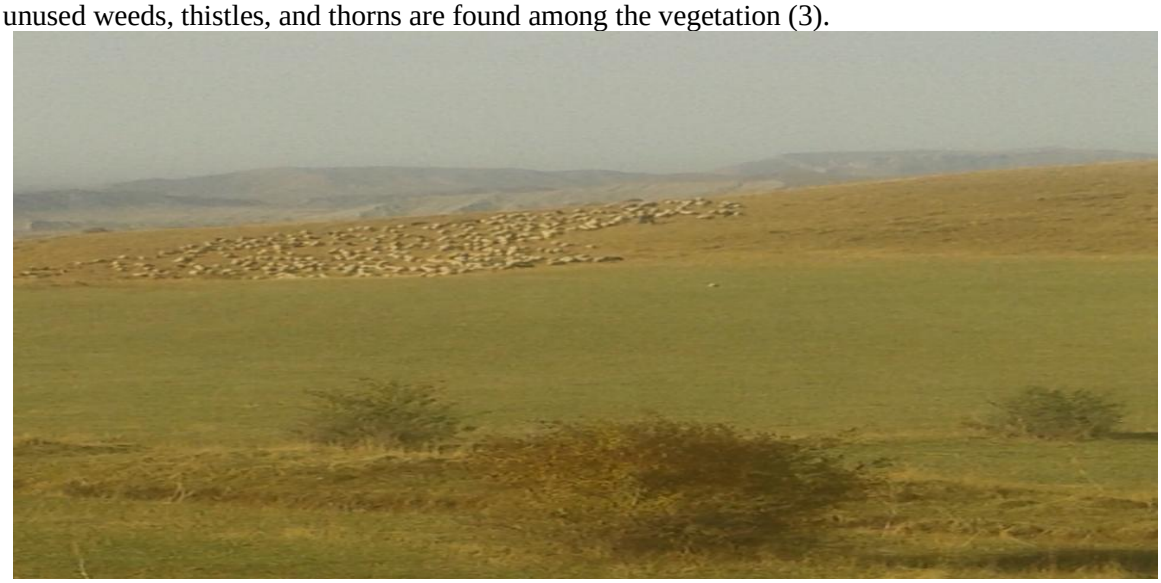


Figure 2. Badamli summer pastures in the Nakhchivanchay basin

The mountainous nature of the area leads to greater slopes. Consequently, in areas where the vegetation is weakened, the soil, another natural component, is also subject to erosion. It is known that the steeper the slope, the faster the erosion process proceeds. As a result, in areas where the vegetation cover has been disturbed, a process of soil cover disruption and wash-off also inevitably occurs. The top humus layer of the soil is washed away by surface runoff (6). The probability of the previous vegetation cover re-establishing

itself in that area is greatly reduced. As a result, a relatively weak landscape is formed in that area, which is a consequence of anthropogenic impact.

Over the past nearly 30 years, military fortifications and roads established to organize the defense of the territory in the border zones as a result of the Armenian aggression have also contributed to the disruption of the landscape complexes. Since most of the summer pastures and alpine meadows are located in this zone, the areas most affected by major technogenic impact are those bordering Armenia. On mountains with high slopes, the dumping of soil along the slope during the construction of military roads, and the areas where the roads are located, are subject to severe soil erosion during rainfall. In large areas, the vegetation and topsoil are covered and destroyed. This is because agronomic regulations that could prevent erosion are not taken into account during construction.

Figure 3. Military fortifications in the high mountains

The main water sources of the highlands are natural lakes and springs. The local population uses these water sources to improve their living conditions. However, by using these natural water sources, they violate the laws of nature and cause significant harm to the environment. For example, the Batabat Lakes area was once a marshland and influenced the surrounding moisture regime accordingly. However, later these wetlands were converted into flowerbeds by people for irrigation purposes, which will affect the surrounding landscape components and lead to the creation of a new landscape type. The seasonal opening and draining of the lakes, which leave them empty for months, also affects the surrounding landscape factors, disrupting its hydrological regime. This process leads to the torfing of the lake, creating a risk of its destruction.

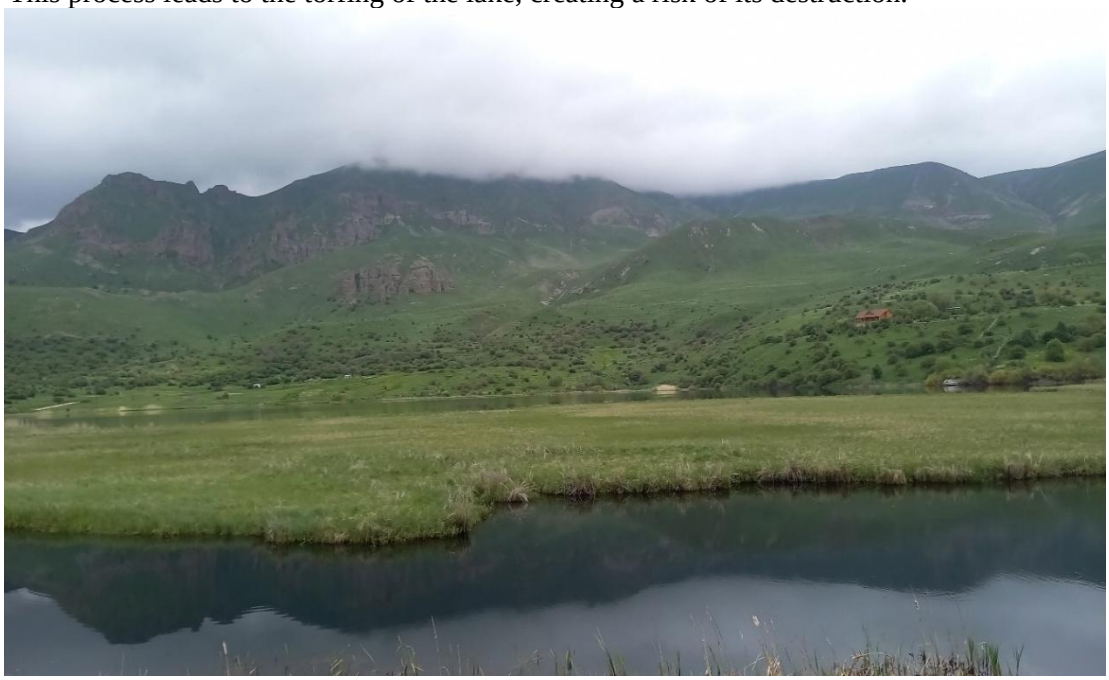


Figure 4. Mirey Batabat Lake

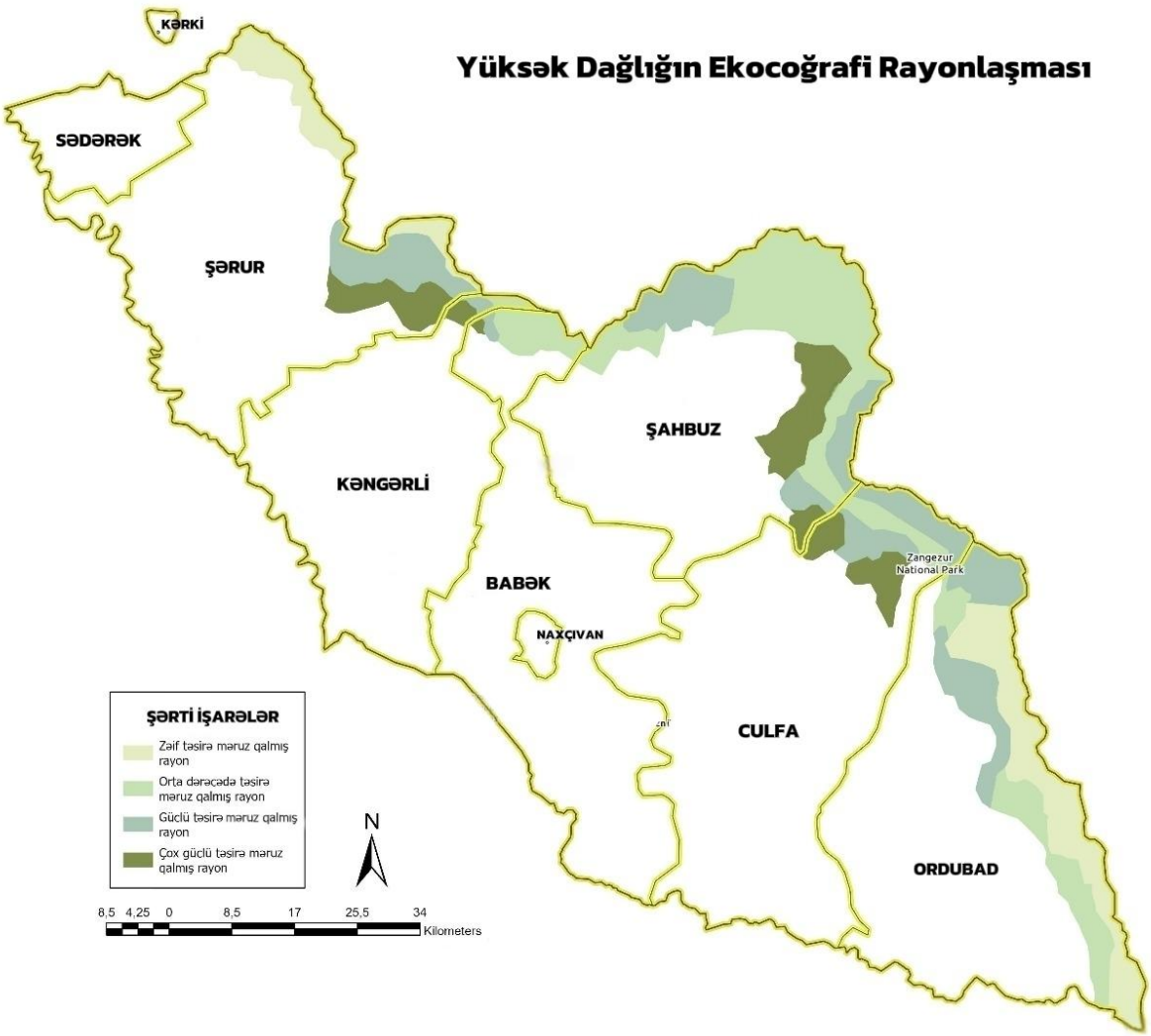
The inhabitants of settlements in the high mountainous region are disrupting the global natural balance by unsustainably exploiting the area's natural springs.

Whereas in the 1960s and 1970s, these mountain villages used water sources in a few locations, today every household in these villages has its own water tap in the yard. Over the past 20-30 years, even springs located 10-15 km from the settlement have had their water completely piped into residents' yards for use. As a result, the plants, soil, and animals—landscape components adapted to the environment around these natural springs and along the valley where the water flows—have been destroyed or are trying to adapt to other areas due to the lack of water. Thus, the biosystem is being disrupted. However, this can be addressed by taking only a portion of the spring water—in proportion to the population's water demand—while conserving the rest. To do this, village councils can collect the waters of these springs in tanks at a high point in the village and from there distribute them equally to households, exercising strict control. In this way, by taking a set amount from each spring, the natural balance can be relatively preserved.

Figure 5. Transportation of spring water to the settlement in Keçili village

The damage caused to the high-mountain area by the aforementioned anthropogenic impact has led to the disruption and, in some places, the destruction of the landscape. Based on our research and considering the ecogeographic conditions to which the high mountains are exposed due to anthropogenic impacts, the following ecogeographic regions of the high mountains have been identified:

1. Highly affected district
2. Severely affected district.
3. Moderately affected district.
4. Slightly affected district.



The most severely affected area consists of the high-mountain settlements and their surroundings, where the cattle of the permanently grazing population graze. In these areas, complete landscape degradation is observed in the areas near the settlements.

As a result of continuous grazing, the vegetation in these areas has been destroyed, the soils have been compacted and denuded of structure by animal trampling, and have been washed away by surface runoff Thus, climate action and the inefficient activities of humans increase erosion processes in high mountains. The same situation can also be observed around animal bedding areas (arxaclar).

References

1. Babayev S.Y. The Geography of the Nakhchivan Autonomous Republic. Baku, Elm, 1999. 226 pp.
2. Aliev G.A. Soils of the Nakhchivan ASSR. Baku, 1988.
3. Mirzəyev P.S. Agroclimatic Characteristics of the Nakhchivan ASSR. Baku 1972.
4. Budaqov B. Babayev S. The Landscape of the Nakhchivan ASSR and Its Agricultural Significance. Nakhchivan Autonomous Soviet Socialist Republic. Baku, 1975, pp. 257-276.
5. Gurbanov E.K. On the dynamics of natural complexes in the Nakhchivan Autonomous Republic. Nakhchivan: Historical reality, modern situation, development prospects. Nakhchivan: 2006, 384 pp.
6. Gurbanov E.K. Soil erosion and its control in the Nakhchivan MR. In: Studies of the Natural Resources of Nakhchivan's Historical Material and Spiritual Culture. Baku: Elm, 2004, pp. 333-338.

Historical sciences

THE POLITICAL DEPENDENCE OF POLAND ON RUSSIA AFTER THE BATTLE OF POLTAVA

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POLTAVA DÖYÜŞÜNDƏN SONRA POLŞANIN RUSİYADAN SİYASİ ASILILIĞI XÜLASƏ

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Abstract

The Battle of Poltava in 1709 proved to be a pivotal turning point that greatly strengthened Russia's position in Eastern Europe and set the stage for Poland's political dependence on its powerful neighbor. In the aftermath of Poltava, the Polish-Lithuanian Commonwealth's internal weaknesses became apparent as foreign influence, especially from Tsarist Russia, grew. By the early 18th century, Poland-Lithuania was formally a sovereign state but had effectively fallen under Russian sway. The watershed "Silent Sejm" of 1717 exemplified this new reality: under the watchful eye of Russian troops and mediation, King Augustus II and the Polish nobility agreed to limit the Commonwealth's army and curtail royal authority, with Russia assuming the unofficial role of guarantor of Poland's political system. In subsequent decades, Russian influence only deepened. During the War of Polish Succession (1733–1735), Russian military intervention ensured the Polish throne for Russia's preferred candidate, reinforcing the notion that Warsaw could no longer decide its fate independently. By the 1760s, the Commonwealth had become a virtual protectorate of Catherine the Great's Russia, culminating in the Treaty of 1768 that explicitly placed Poland under Russian "perpetual friendship" (in effect, protection). Polish attempts to regain autonomy – such as the Bar Confederation's revolt against Russian influence – were suppressed by force. Ultimately, Russia's domination, in concert with Prussia and Austria, led to the partitions of Poland (1772, 1793, 1795) and the complete loss of Polish independence. In sum, from the aftermath of Poltava onward, Poland's political destiny was increasingly dictated by Russia, until the Commonwealth's final collapse at the end of the 18th century.

Xülasə

1709-cu ildə baş vermiş Poltava döyüşü Şimal müharibəsində həlledici dönüş nöqtəsi oldu. Bu qələbədən sonra Rusiya İmperiyası Şərqi Avropada əsas hərbi-siyasi gücə çevrildi və Polşa-Litva Birliyinin taleyinə güclü təsir göstərməyə başladı. XVIII əsrin ilk onilliklərində Polşa dövləti siyasi cəhətdən zəiflədi və daxili çəkişmələrdən əziyyət çəkdi. 1717-ci ildəki "Səssiz Seym" Polşa içərisində rus təsirinin bariz nümunəsi idi – Rusiyanın vasitəçiliyi ilə Polşa kralı II Avqust və zadəganlar razılaşmaya məcbur edildi. Bu razılaşma nəticəsində Polşa ordusu və kral hakimiyyəti məhdudlaşdırıldı, Rusiya isə faktiki olaraq Polşa-Litva Birliyinin daxili işlərinin "qarantı" statusunu əldə etdi. Növbəti onilliklərdə rus çarlarının təsiri daha da artdı: 1733–1735-ci illərin Polşa varislik müharibəsində Rusiya öz namizədini taxta çıxardı, 1768-ci ildə isə imzalanan müqavilə ilə Polşa rəsmən Rusiya himayəsinə girdi. Beləliklə, Polşa-Litva Birliyi tədricən suverenliyini itirərək Rusiya və qonşu dövlətlərin siyasi oyuncağına çevrildi; nəticədə XVIII əsrin sonunda Polşa torpaqları bölüşdürülərək dövlət müstəqilliyinə son qoyuldu.

Keywords: Battle of Poltava; Polish-Lithuanian Commonwealth; Russian influence; Silent Sejm; Bar Confederation; Partitions of Poland; 18th-century Eastern Europe

Açar sözlər: Poltava döyüşü, Polşa-Litva birliyi, Rusiya təsiri, səssiz seym; Bar konfederasiyası; Polşanın bölüşdürülməsi; XVIII əsr Şərqi Avropa

Introduction

The Battle of Poltava in 1709 was an event that played an important role in Russian history and in the balance of power in Eastern Europe. In this battle, under the leadership of Peter I, the Russian army dealt a decisive blow to the forces of Swedish King Charles XII, changing the course of the Great Northern War. As the star of the Swedish Empire began to set, Russia emerged as a rising power in the region. The Polish-Lithuanian Commonwealth, on the other hand, was severely shaken by this turn of events: after Poltava,

Poland's internal political situation and the struggle for its throne fell under Russia's direct influence. At that time, the Polish-Lithuanian Commonwealth was formally an independent state, but in reality its politics increasingly began to submit to the will of the Russian Empire.

In the early 18th century, the Commonwealth's state structure was built on the principles of "Golden Liberty" (the freedoms of the szlachta nobility and the liberum veto). However, internal instability and weak central authority left the country open to foreign intervention. During the Great Northern War, the internal struggle for the Polish throne between Augustus II (Frederick Augustus of Saxony) and the Sweden-backed Stanisław Leszczyński further weakened the Commonwealth's political system. In 1704, with Charles XII's intervention, Stanisław Leszczyński was proclaimed King of Poland, but after the defeat at Poltava, Sweden's influence in the region vanished. As a result, Augustus II, who had sought refuge under Russia's protection, returned to the Polish throne in 1709. This event showed that the Commonwealth was forced to change even its monarch at the behest of foreign armed forces. The victory at Poltava gave Russia not only military power, but also a great advantage in terms of political influence in the region. Now Peter I was in a position to openly interfere in Polish affairs. In the 1710s, as internal conflicts continued in Poland, Russia found an opportunity under the guise of "friendly assistance" to keep its troops on Polish territory and dictate political conditions.

Main Body

After Poltava, the Russian Empire's influence on the Polish-Lithuanian Commonwealth began to take on a systematic character. The Tarnogród Confederation of 1715–1717 and the ensuing "Silent Sejm" of 1717 marked the formal beginning of this dependency. The Tarnogród Confederation was a revolt of Polish nobles (szlachta) against Augustus II's policies and the presence of Saxon troops in the country. Taking advantage of this internal conflict, Peter I presented himself as a mediator and took control of the negotiations between the Poles and the Saxon king. On November 3, 1716, an agreement between Augustus II and the confederates was signed in Warsaw with a Russian representative present. As a result, the famous "Silent Sejm" convened on February 1, 1717 approved the terms of that agreement without any debate. This Sejm is called "silent" because not a single deputy engaged in extensive discussion – the session essentially ended with acceptance of the terms dictated by the Russian envoy, Count Golovkin.

The Silent Sejm's resolutions limited the number of Saxon troops allowed to remain with King Augustus II to a 1,200-man personal guard, reduced the Commonwealth's own army to a total of 24,000 men, and put an end to the king's attempts at absolute rule (his decisions were now balanced by szlachta privileges). Most importantly, Russia was declared the guarantor of the agreement's observance [4]. In other words, the Russian emperor assumed the role of surety that Poland's internal system would remain unchanged. As historian Jacek Kordel writes, in the first decades of the 18th century the Commonwealth effectively lost its sovereignty and became the object of its powerful neighbors' political games [4]. The Silent Sejm thus set a precedent that legally cemented Russia's hegemony over Poland. After this event, the Polish state could no longer act in domestic or foreign affairs outside of Moscow's will or permission [5].

Russia's growing influence over Poland continued even after Peter I's death (1725). Although Augustus II at one point (in 1719) tried to escape Russian influence and pursue an independent policy, those efforts failed. In 1719, Augustus sought a rapprochement with the Austrian Empire to craft a policy against Russia. However, that same year Peter I responded by secretly forging an agreement with King Frederick William I of Prussia [4]. This agreement, known as the 1720 St. Petersburg Convention, bound Russia and Prussia to ensure that the Commonwealth's political system remained unchanged. Both empires agreed that Poland's elective monarchy and institutions like the liberum veto must remain inviolable; the king's power was not to be strengthened, nor were any military or financial reforms to be allowed. In practice, this meant that any attempted reform to strengthen Poland would be blocked by foreign powers. Indeed, that is what happened: until the mid-18th century, Russia and Prussia inserted special clauses concerning Poland into numerous alliance treaties (in 1726, 1729, 1730, etc.), making the Commonwealth's weak and dependent status a part of their foreign policy [4]. Through this strategy, the Russian Empire increased its international influence and steered the "Polish question" to its liking. Prussia, for its part, saw the prospect of expanding its own territories at the expense of a weak Poland. The Commonwealth's statesmen were left in a helpless position: the internal Golden Liberty system paralyzed any reform initiative, and attempts to change this status quo were branded as treason by Russia and thwarted.

After Augustus II's death in 1733, another crisis struck the Polish throne. The War of Polish Succession (1733–1735) once again proved how open the Commonwealth was to foreign intervention. During the royal election, the szlachta were split between two candidates: one faction supported Augustus's son, the Saxon Elector Frederick Augustus (who would become King Augustus III), while the other backed the former king Stanisław Leszczyński, who had French support. Two rival elections ensued, creating a dual claim to the throne and sparking a Europe-wide war. In this war, Russia's involvement was decisive – Empress Anna (Peter I's

successor) sent her army into Poland and crushed Leszczyński's supporters. In 1734, Russian troops besieged and captured the city of Danzig (Gdańsk), forcing Stanisław Leszczyński to flee the country (Stone, 2001). Thus, the Saxon prince was proclaimed King of Poland as Augustus III, and Russia's will was satisfied. Russia's ability to fill the Polish throne according to its own designs further deepened the Commonwealth's political dependence. Henceforth, the Polish-Lithuanian monarch essentially ruled under Russian oversight, and any serious possibility of resisting Russian influence was extremely limited. In the mid-18th century (during Augustus III's reign), Poland effectively experienced "years of silence" – the central authority was weak and szlachta anarchy persisted. This state of affairs minimized Poland's role in international relations. The Commonwealth's neighbors (especially Russia and Prussia) took strategic advantage of this weakness. With Russian support, Poland was kept closed to reform during Augustus III's time; sessions of the Sejm were frequently paralyzed by the liberum veto, and each time Russia's ambassadors and agents in Warsaw would behind the scenes bribe or threaten deputies to guide outcomes to Russia's favor [6].

By the 1760s, the Commonwealth's political dependence had reached its climax. No sooner had Augustus III died in 1763 than Russia once again refused to leave the Polish throne to chance. With Empress Catherine II's direct support and pressure, her protégé Stanisław II Poniatowski was elected King of Poland in 1764. Stanisław Poniatowski had previously served as ambassador in St. Petersburg and, in his youth, was known as a favorite at Catherine II's court [2]. During the king's election, Russia's ambassador in Warsaw, Prince Nikolai Repnin, openly intervened, using the presence of Russian troops to influence the Sejm. Thus, the Commonwealth's last king ascended the throne essentially by Russia's appointment. Stanisław II was formally an enlightened, reform-minded monarch, but pursuing an independent policy was virtually impossible – he was surrounded by Russia's "advisers" and military forces [1].

To further formalize her influence in Poland, Catherine II took a series of steps under Repnin's diktat in 1767–1768. The Sejm convened in 1767 under Russian pressure (the Repnin Sejm, named after the pro-Russian Confederation of Radom) affirmed the Commonwealth's "Cardinal Laws." According to these fundamental laws, the szlachta privileges (the liberum veto, the monarchy's limited prerogatives, the right to free election, etc.) were declared untouchable, and Russia was named as the guarantor of this status quo [2]. At the same time, this Sejm – at Russia's behest – passed laws granting full rights to Orthodox and Protestant dissident nobles. These decisions caused serious discontent in Polish society and were regarded as open Russian interference. As a result, in February 1768 a group of patriotic nobles formed the Bar Confederation as armed resistance against Russian tutelage and Stanisław Poniatowski. The Bar confederates, rallying under the slogan "for faith, fatherland and freedom," rose up against Russian troops and the king's supporters [1].

However, this united domestic uprising was met with a powerful Russian military response. Under the pretext of quelling civil strife, Catherine II sent additional troops into Poland. Between 1768 and 1772, the Russian army gradually defeated the confederate forces; even in 1770, Russia declared war on the Ottoman Empire (seen as a protector of the Bar rebels), igniting the Russo-Turkish War of 1768–1774. In the end, the Bar Confederation was crushed, and thousands of Polish patriots were exiled or sent to Siberia [7]. These events demonstrated that attempts to restore the Commonwealth's independence were in vain, and that the country was now completely subject to Russia's military-political power.

In 1772, the first partition of the Polish-Lithuanian Commonwealth took place. Exploiting Poland's weakness, the empires of Russia, Prussia, and Austria agreed to divide up large portions of its territory among themselves. This was a severe blow to the Commonwealth's sovereignty as a subject of international law: for the first time in history, Polish lands were annexed by neighboring powers through a formal agreement. The Commonwealth continued to exist, but the country was now greatly reduced and even more debilitated. Stunned by the partition, Polish society finally turned to belated reforms. In 1773, King Stanisław Poniatowski and some reform-minded nobles created a body known as the Permanent Council in an attempt to introduce changes in governance. Likewise, groundwork was laid for innovations in education, the military, and the economy. These reform efforts culminated in the adoption of the Constitution of May 3, 1791. By enacting Europe's first written constitution, the Commonwealth aimed to establish a constitutional monarchy in place of absolutism, abolish the liberum veto, and regulate the king's authority and the obligations of landlords [1].

However, it was too late – Poland's neighbors, who had vowed never to permit the country an independent policy, moved immediately. Catherine II viewed the new Polish constitution as a threat to her influence and encouraged conservative Polish magnates to form the Targowica Confederation, then in 1792 intervened in Poland. Russian troops easily defeated the supporters of the Constitution, and Stanisław Poniatowski was forced to submit to the new terms. This paved the way for the second partition: in 1793 Russia and Prussia seized and divided up even more of Poland's territory [2]. By that point, the Commonwealth had been reduced to a tiny rump state with virtually no independent political life remaining. The Kościuszko Uprising of 1794 was the Poles' final attempt to restore independence – under the leadership of Tadeusz Kościuszko, the

populace rose against Russia and Prussia. But once again, the Russian army (together with Prussia) drowned the revolt in blood. Finally, in 1795, by agreement among the three partitioning powers, the remaining lands of the Commonwealth were divided and the state was erased from the map. The last king, Stanisław II, was forced to abdicate, and thus a country that had once been one of Europe's greatest states was completely destroyed [1].

The vast majority of historians agree that after the Battle of Poltava the Commonwealth rapidly fell into dependence on Russia. For example, leading researcher Robert Frost notes that the victory at Poltava opened a period of "political-cultural hegemony" for Russia not only over Sweden but also over Poland (Frost, 2009). Polish historian Lucjan Lewitter likewise emphasizes that as a result of Peter I's policies, Poland became a vassal ally during the Great Northern War and, after the war ended, was de facto drawn into Russia's sphere of influence [5]. Some scholars even argue that had it not been for Russia's intervention after Poltava, the Commonwealth might have been able to reform its system and preserve its independence [3]. The historical course shows that the chain of processes set in motion by Poltava progressively eroded Poland's existence as a fully sovereign state. The Polish political elite did attempt from time to time to escape this dependence (in 1719, 1733, 1768, 1794), but each time these attempts were thwarted by the intervention of neighboring empires. Renowned historian Norman Davies observes that although Polish nobles, recognizing the country's subjugation to Russia, formed confederations to fight for liberty, in the end those rebellions worsened the situation and hastened Poland's complete partition [2]. Thus, after Poltava the Polish-Lithuanian Commonwealth steadily moved along a trajectory of losing its political independence. This dependence initially took the form of an informal protectorate, later an overt one, and ultimately led to the state's total demise.

Conclusion

The Battle of Poltava in 1709 was a watershed moment in the fate of the Polish-Lithuanian Commonwealth. After this defeat, Poland's international position was irreversibly shaken and a period of Russian hegemony in the region began. In the following decades, the Commonwealth retained its formal sovereignty, but in practice its political decisions became largely dependent on Russia. Peter I and his successors sequentially applied diplomatic, military, and political pressure on Poland, subordinating the Commonwealth's internal and external policies to their interests. The Silent Sejm of 1717 and Augustus II's compliance with Russia's dictate, followed by Augustus III's placement on the throne by Russian bayonets, and Stanisław Poniatowski's election under Catherine II's tutelage – all these events showed that Poland's state independence survived only on paper. Throughout the 18th century, although Polish society made a number of attempts to break free from this dependence, none succeeded. Neither confederation movements nor reform efforts could extricate Poland from Russia's influence. On the contrary, each failed attempt left the country even weaker. Consequently, in 1772, 1793, and 1795 the Commonwealth was partitioned in stages by its three neighboring empires and wiped off the map of Europe.

The post-Poltava situation demonstrated once again that a country lacking internal political unity and a strong central authority can easily become a victim in the great powers' game. The Polish-Lithuanian Commonwealth prided itself on its "Golden Liberty" system, but that system could not ensure effective statehood under new geopolitical realities. Russia, for its part, made full use of the power it gained after Poltava to incorporate Poland into its sphere of influence and gradually absorb it. As a bitter lesson of history, the Commonwealth's political dependence and partition in the 18th century showed other nations the importance of safeguarding state sovereignty, as well as how destructive the influence of great powers on smaller neighbors can be. Ultimately, the story of "Poland after Poltava" is a dramatic example of how a state can gradually lose its independence. This historical lesson left a deep mark on the Polish people's memory and influenced subsequent generations' struggles for national freedom.

References

1. Butterwick-Pawlikowski R. (2020). The Polish-Lithuanian Commonwealth, 1733–1795: Light and Flame. New Haven, CT: Yale University Press.

2. Davies N. (2005). God's Playground: A History of Poland, Vol. 1: The Origins to 1795 (Revised ed.). Oxford: Oxford University Press.

3. Frost R. I. (2009). "Everyone understood what it meant": The impact of the Battle of Poltava on the Polish-Lithuanian Commonwealth. Harvard Ukrainian Studies, 31(1–4), 159–176.

4. Kordel J. (2017). The Polish-Lithuanian Commonwealth in eighteenth-century alliance treaties of the neighbouring countries, 1720–72. Acta Poloniae Historica, 116, 143–179.

5. Lewitter L. R. (1981). Intolerance and foreign intervention in early eighteenth-century Poland-Lithuania. Harvard Ukrainian Studies, 5(3), 283–305.

6. Lukowski J. (1991). Liberty's Folly: The Polish-Lithuanian Commonwealth in the Eighteenth Century, 1697–1795. London: Routledge.

7. Stone D. (2001). The Polish-Lithuanian State, 1386–1795. Seattle, WA: University of Washington Press.

Medical sciences

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CARDIOTOXICITY IN MODERN ANTICANCER THERAPY: CLINICAL SIGNIFICANCE, DIAGNOSIS AND PREVENTION

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Abstract

Cardiotoxicity is one of the most significant limiting factors in modern anticancer therapy, significantly impacting its safety and long-term outcomes. The increasing use of anthracyclines, targeted agents, and immune-mediated therapies increases the risk of myocardial dysfunction, arrhythmias, myocarditis, and other cardiovascular complications. Of particular clinical significance is the fact that cardiotoxic effects can manifest both during treatment and years after its completion. Improved early diagnostic methods enable the detection of early signs of myocardial damage and prompt adjustment of treatment strategies. Assessing individual risk factors, such as age, comorbidities, and cumulative doses of cardiotoxic drugs, is crucial. Advances in cardio-

oncology and a multidisciplinary approach ensure more effective prevention and treatment of cardiac complications. Therefore, the problem of cardiotoxicity requires further research and the integration of cardiological strategies into oncology practice.

Keywords: oncology, cardiology, cardio-oncology, cardiotoxicity, cardiac complications, cardiovascular complications, cardiovascular disease, anticancer therapy, chemotherapy, radiotherapy, biomarkers, Cardio-miRNAs, cardiac risk factors.

In recent decades, oncology has experienced rapid progress, driven by the introduction of new classes of anticancer drugs, refined surgical approaches, and the development of radiation therapy and personalized medicine. These advances have significantly increased the life expectancy of patients with various forms of malignancy, and for many patients, cancer has become a chronic, potentially manageable condition. However, alongside the increased effectiveness of anticancer therapy, the problem of its adverse effects is becoming increasingly pressing, with cardiotoxicity being the key and most clinically significant. Cardiovascular damage caused by chemotherapy, targeted agents, immune drugs, and radiation exposure is now considered one of the most serious limitations to treatment effectiveness and a cause of decreased quality of life for surviving patients.

The relevance of cardiotoxicity research is driven by several factors. First, the number of cancer patients is steadily increasing worldwide due to increasing life expectancy and improved diagnostic methods. Secondly, modern therapy is becoming increasingly intensive and multi-component, increasing the risk of cumulative toxic effects on the myocardium. Thirdly, improved survival creates a new set of clinical challenges related to the long-term consequences of treatment, which manifest themselves years after remission. Cardiac complications are becoming one of the leading causes of late morbidity and mortality among cancer patients, making the problem interdisciplinary and requiring the collaboration of oncologists, cardiologists, rehabilitation specialists, and primary care physicians.

In clinical practice, cardiotoxicity manifests itself in a wide range of conditions – from subclinical reduction in myocardial contractility to severe chronic heart failure, arrhythmias, ischemia, arterial hypertension, and thromboembolic complications. Various drugs can cause myocarditis, vasculitis, conduction disturbances, pericarditis, and resistant hypertension, which often progresses rapidly and requires urgent diagnosis and treatment.

A separate area of research is the study of radiation therapy cardiotoxicity. Despite improvements in irradiation technologies and reductions in doses to critical structures, radiation-induced cardiac damage remains a pressing problem for patients with lymphomas, breast cancer, and chest tumors. Radiation exposure can lead to late changes, such as valve fibrosis, coronary artery disease, restrictive cardiomyopathy, and conduction system abnormalities, which manifest decades after completion of treatment.

The growing interest in cardio-oncology reflects the understanding that successful cancer treatment is impossible without managing associated risks. Current research focuses on developing strategies for early identification of high-risk patients, optimizing cardiac monitoring methods, and implementing programs for the prevention and treatment of cardiac complications. However, despite the accumulated data, a unified strategy for monitoring and long-term risk management of cardiotoxicity is still being developed, underscoring the importance of further research.

Understanding the mechanisms of cardiotoxicity remains an important task. The molecular pathways of cardiac tissue damage caused by antitumor agents are extremely diverse and include oxidative stress, mitochondrial dysfunction, cardiomyocyte apoptosis, impaired angiogenesis, immune responses, and inflammation. Understanding these mechanisms opens the way to personalized approaches – the use of cardioprotectors, dosage optimization, selection of drugs with a lower risk profile, and individualized adjustment of concomitant therapy. A particularly promising area is the development of biomarkers of predisposition, allowing for the prediction of the development of cardiac complications before treatment and the adjustment of the therapeutic regimen in advance.

The problem of cardiotoxicity extends beyond purely medical considerations. It affects socioeconomic aspects, as complications associated with cardiac damage require expensive and lengthy treatment, increase the number of hospitalizations, and impact patient productivity. With the growing number of cancer survivors, the need for specialized cardio-oncology centers providing a multidisciplinary approach to patient care is growing. The development of such services facilitates the timely diagnosis of complications, improves prognosis and quality of life, and reduces the risk of interruption or modification of anticancer therapy for cardiac reasons.

An additional layer of complexity is created by the fact that many patients begin treatment with pre-existing cardiac risk factors, such as hypertension, dyslipidemia, obesity, diabetes, genetic predisposition, and

others. These conditions increase the likelihood of developing cardiotoxicity and require comprehensive intervention. Thus, modern approaches to cancer treatment require not only the selection of optimal anticancer therapy but also active primary and secondary prevention of cardiovascular complications.

As noted by Belenkov Y.N. et al. [1], over the past few decades, due to the extensive implementation of cancer screening programs, up-to-date early diagnostic methods, and effective combinations of antitumor therapy, it has become possible to significantly improve survival of cancer patients. At the same time, despite the effective treatment of malignancies, most patient face adverse and often life-threatening effects of specific treatment on the heart and blood vessels. All this resulted in active development of a new field in cardiology, cardio-oncology.

In the work of Chan M.F. et al. the authors say that they conducted a comprehensive database search to review and consolidate data regarding chest radiotherapy and effects on the heart as well as techniques to minimize exposure to the heart. The research findings demonstrate associations between radiation exposure to cardiac substructures and subsequent cardiotoxicity. At the same time, advanced cardiac-sparing techniques, notably respiratory motion management, have emerged as pivotal strategies to minimize the likelihood of cardiac events. Radiation-induced heart disease is a known potential toxicity in patients undergoing chest radiotherapy and thus there is a need to understand the associated risks and find methods to minimize them. Our colleagues focus on the fact that proton therapy can spare the heart and other vital organs while still delivering high radiation doses to tumors, potentially making it a superior option for treating breast and lung malignancies. Ongoing studies with longer follow-ups are needed to further elucidate its cardiac sparing advantage. Additionally, we need to investigate the effects of concurrent radiotherapy and immunotherapy on the heart, as existing research indicates that immunotherapy can lead to cardiac issues such as myocarditis, arrythmias, and heart failure. The combination of these therapies may exacerbate these negative effects, so they should be used cautiously. Lastly, we need to further study how patient specific factors, such as pre-existing coronary artery disease or reduced ejection fraction, can help tailor radiation therapy more effectively [2].

Advances in cancer treatment have improved in patient survival rate. On the other hand, management of cardiovascular complications has been increasingly required in cancer patients. Thus, cardio-oncology has attracted the attention by both oncologists and cardiologists. Cardiovascular imaging has played a key role for non-invasive assessment of cardiovascular alterations complimentary to biomarkers and clinical assessment. Suitable imaging selection and interpretation may allow early diagnosis of cardiovascular injury with potential implications for therapeutic management and improved outcomes after cancer therapy. Echocardiography has been commonly used to evaluate cardiac dysfunction in cardio-oncology area. Cardiac computed tomography is valuable for assessing structural abnormalities of the myocardium, coronary arteries, and aorta. Molecular imaging has an important role in the assessment of the pathophysiology and future treatment strategy of cardiovascular dysfunction. Cardiac magnetic resonance imaging (MRI) is valuable for characterization of myocardial tissue. Positron emission tomography (PET) and Single Photon Emission Computed Tomography molecular imaging has potential roles for quantitative assessment of cardiovascular disorders. Particularly, Fluorodeoxyglucose-PET is considered as an elegant approach for simultaneous assessment of tumor response to cancer therapy and early detection of possible cardiovascular involvement as well. Cardio-oncology represents an important new area that should be covered by multiple specialist teams, including medical and radiation oncologists, cardiologists, diagnostic radiologists, technologist, nurses, and pharmacists. Interdisciplinary cooperation among these specialists is mandatory for accurate and timely diagnosis and also suitable management for each cancer patient. Cardiologists should be knowledgeable about the strengths and limitations of various imaging modalities, including echocardiography, cardiac MRI, and nuclear imaging. They should select the appropriate modality based on the clinical scenario and the specific information needed. Many oncologists should understand various cardiotoxic effects after new cancer treatments. In addition, radiologists should play an important role for selecting suitable imaging modalities and interpreting not only the tumor itself but also the condition of the heart when viewing tumor images in order to provide important messages from these images for both cardiologists and oncologists. Radiologists should be aware of the critical role that imaging plays in the diagnosis, monitoring, and management of cardiotoxicity in cancer patients. Understanding the appropriate use of each imaging modality is essential for providing comprehensive care. Radiologists should stay informed about the latest advancements in imaging technologies and techniques, such as cardiac MRI and nuclear imaging, to ensure accurate assessment and timely detection of cardiotoxic effects. Cardiovascular imaging has evoked as a key role for this purpose, allowing non-invasive evaluation of cardiovascular alterations complimentary to biomarkers and clinical assessment. Suitable imaging selection and interpretation may permit not only for early diagnosis of cardiovascular injury but also accurate assessment treatment effects. Thus, the imaging will provide impact on therapeutic management and improved outcome after cancer therapy [3].

A very indicative and interesting study in the clinical and prognostic aspect was conducted by Klotzka A. et al. [4]. The purpose of this study was to gather information on respondents' knowledge of their treatment, awareness of cardiovascular risks associated with cancer therapy, and the factors associated with these outcomes. The level of awareness was related to age, education, as well as health behaviors and communication with the physician. As the authors note cardio-oncology is a relatively young but rapidly developing branch of medicine. It combines cardiology and oncology. Both of these fields are associated with the largest number of morbidity cases in the world, and thus the largest number of deaths. Cardio-oncology addresses the cardiac complications of oncological treatment at every stage of cancer therapy. Cardiovascular complications have become increasingly common among cancer survivors, largely due to improved treatment outcomes and longer survival. As events like myocardial infarction and heart failure now significantly affect long-term health, assessing patients' awareness of these risks is essential. Cardio-oncologic complications extend beyond the duration of oncologic treatment. Chemotherapy, radiotherapy, or immunotherapy, which are widely used in oncology, can lead to adverse cardiovascular events both during and years after oncological treatment.

A cross-sectional study was conducted among 243 patients attending an outpatient cardio-oncology clinic in Poznan, Poland. Participants were informed about the aim of the study while in the clinic waiting room. Subsequently they completed an anonymous questionnaire voluntarily after the visit to the office. Completing the paper-and-pencil survey took an average of 10-15 min. If necessary, patients could count on professional assistance in completing the questionnaire. They could ask questions while completing the survey and withdraw from the study at any time. Eligibility criteria included being an adult and having a confirmed diagnosis of any type of cancer. Data collection was carried out between October 2023 and April 2024. According to the statement KB-919/22 issued by the Bioethics Committee of the Poznan University of Medical Sciences (Poznan, Poland) the study did not constitute a scientific experiment.

Based on a review of the literature and relevant recommendations, a structured questionnaire was developed, comprising three sections: (1) questions related to cardio-oncology, (2) questions related to health behaviors, and (3) sociodemographic items. 37 items were single-choice, and 3 were multiple-choice. The tool was reviewed by four subject-matter experts in the fields of cardiology, public health, patient education, and healthcare.

The following questions examined patients' awareness of cardiac complications:

What is cardio-oncology?

In your opinion: Can chemotherapy "damage" the heart?

In your opinion: Should the heart be monitored during chemotherapy?

In your opinion: Should one go to a cardiologist for follow-up after cancer treatment?

In your opinion: Should the heart be monitored after radiation therapy to the chest?

In your opinion: Can radiation therapy to the chest "damage" the heart?

Other questions concerned examinations and providing information by the doctor:

Did your doctor inform you about possible cardiac complications caused by cancer drugs?

Did your doctor inform you about possible cardiac complications caused by radiation therapy to the chest?

Did a cardiologist examine you during cancer treatment?

Did you have an echocardiogram. known as a cardiac echo. during your cancer treatment?

The response options "no" and "I don't know" or "I don't remember" were combined during the statistical process because we wanted to obtain a clear classification of respondents in terms of their knowledge. Differentiating between a lack of knowledge and an uncertainty about one's knowledge did not result in a significant statistical difference [4].

The response rate was 80%. The majority of participants were women, comprising 75.7% of the total sample. The mean age of respondents was 51.2 years (SD = 9.8), and the mean Body Mass Index (BMI), calculated based on self-reported weight and height, was 27.0 (SD = 18.7). More than half of the participants (53.5%) were classified as having an elevated BMI. The largest educational subgroup included individuals with secondary education (38.7%). Additionally, over half of the sample resided in large urban areas (53.5%) and were actively employed (61.7%). Only a small proportion of respondents (9.1%) rated their financial situation as good or very good. Breast cancer was the most commonly reported cancer type, accounting for 55.6% of cases. In terms of treatment, approximately 32% of patients reported receiving both chemotherapy and radiotherapy, whereas nearly 27% were unaware of the specific oncological treatment they had undergone. Patients' awareness of cardiac complications associated with their cancer treatment and the relationship with various demographic variables were analyzed. In questions concerned patients' awareness, examinations and providing information by the doctor the response options "no" and "I don't know" or "I don't remember" were combined during statistical process. The researchers wanted to obtain a clear classification of respondents in

terms of their knowledge. The respondents were divided into two groups - those having knowledge and the rest - in order to examine the differences between them. As a result, we observed a statistically significant difference between these groups. Patients were asked to select the correct definition of cardio-oncology. Only 23.5% of respondents knew what cardio-oncology is. Statistical significance was identified in age, education level, BMI and type of oncological therapy received by the patient. Among patients under 40 years old, awareness of cardiac complications was the highest. This awareness declined with increasing age and increased with the level of education. Additionally, most individuals with obesity and those unaware of the type of oncological therapy they were receiving also lacked knowledge of cardio-oncology. Statistical significance in relation to financial situation was identified only in questions concerning complications after chemotherapy. Patients who declared an average financial situation were least likely to say that the heart should be monitored. A significant correlation was also noted between patient awareness and physician actions. Only 24.3% of patients were informed by their oncologist (or remember being informed) about possible cardiac complications caused by cancer drugs. An even smaller proportion (12.4%) remembered that their doctor informed them about possible cardiac complications caused by chest radiotherapy. Nearly 32% of patients were not examined by a cardiologist during cancer treatment, and more than half (53.5%) underwent echocardiography during cancer treatment. However, 95.5% of patients believed that every patient undergoing cancer treatment should have a cardiology consultation. Patients who were informed about possible complications and underwent cardiological examinations had better knowledge about complications and the need to monitor their heart after cancer treatment. The results from Health Behavior Scale domains showed that out of a possible 45 points, respondents scored an average of 24.21 (SD = 8.18) points. Preventive behaviors related to the healthcare system received the lowest score (1.33 out of 3 possible), which indicates that patients diagnosed with cancer relatively rarely underwent preventive prostate cancer screening or smear test. On the other hand, patients scored highest in the Unhealthy behaviors domain, which indicates that they rarely consume tobacco or alcohol products (2.05 ± 0.46). The Mann-Whitney U test indicated a statistically significant association between patients' health behaviors and cardio-oncology knowledge ($p < 0.001$). Individuals who knew what cardio-oncology is and provided correct answer declared healthier behaviors ($M = 27.9 \pm 6.0$) than those who did not have this knowledge ($M = 23.1 \pm 8.5$). Patients who were aware that chemotherapy and radiotherapy could have negative cardiac consequences also exhibited better health behaviors related to diet, physical activity or healthcare system. Among those who completed our questionnaire, 54 participants (22.22%) reported receiving chemotherapy, while 79 (32.51%) received both chemotherapy and radiation therapy. Radiation therapy alone was used in 45 individuals (18.52%). Notably, 65 participants (26.75%) did not know what type of cancer treatment they had undergone. As the authors note it is concerning that such a large group of patients, despite having undergone potentially cardiotoxic therapy, were not aware of the need for regular follow-up. Nearly half of them had received chest radiotherapy, and it is well known that its complications increase over time - coronary artery disease or valvular dysfunction may appear even 20 years after treatment. In the absence of follow-up, patients often present to a cardiologist only at an advanced stage of disease. Even more striking are the data showing that more than 26% of patients in the cardio-oncology clinic did not know what type of oncologic therapy they had received. It is difficult to determine whether this results from denial of the cancer diagnosis, lack of interest in their health despite the disease, or concomitant depression [4].

Summarizing the conducted research, our colleagues state that cardio-oncology is becoming an indispensable component of comprehensive care for oncology patients. As cancer treatments continue to improve in effectiveness, they are increasingly associated with a risk of cardiovascular complications that can significantly impair patients' quality of life and affect overall prognosis. The early involvement of a cardiologist at the stage of planning oncological therapy allows for individualized risk assessment and timely implementation of preventive measures. Unfortunately, as demonstrated by study, the level of knowledge among oncology patients regarding potential complications of chemotherapy and radiotherapy remains insufficient. There is a clear need to implement effective educational programs aimed at increasing awareness of these risks and fostering stronger interdisciplinary collaboration between oncologists, cardiologists, and primary care physicians. Greater emphasis should be placed on prevention through the control of comorbidities that already increase baseline cardiovascular risk, such as hypertension, diabetes, and obesity, even before the initiation of cancer treatment. Regular cardiac monitoring during and after therapy should become the standard of care. Patients must also receive clear and comprehensible information about the potential adverse cardiovascular effects of oncological treatment. Improved patient education may enhance patient engagement in the treatment process and facilitate the early detection of cardiac complications. As shown in survey, patients who were informed by their physician about the potential cardiotoxicity of oncological therapies demonstrated more health-conscious behaviors. Early identification of cardiotoxicity enables timely intervention, reducing the likelihood of

long-term complications. This proactive approach not only enhances treatment safety but also strengthens patients' trust in the healthcare system as a whole [4].

Yang M. et al. [5] in their work emphasize that with the increase of aging population and prevalence of obesity, the morbidity of cardiovascular disease (CVD) and cancer has also presented an increasing tendency. These two different diseases, which share some common risk factors. Relevant studies in the field of reversing cardio-oncology have shown that the phenotype of CVD has a significant adverse effect on tumor prognosis, which is mainly manifested by a positive correlation between CVD and malignant progression of concomitant tumors. This distal crosstalk and the link between different diseases makes us aware of the importance of diagnosis, prediction, management and personalized treatment of systemic diseases. The circulatory system bridges the interaction between CVD and cancer, which suggests that we need to fully consider the systemic and holistic characteristics of these two diseases in the process of clinical treatment. The circulating exosome-miRNAs has been intrinsically associated with CVD-related regulation, which has become one of the focuses on clinical and basic research (as biomarker). The changes in the expression profiles of cardiovascular disease-associated miRNAs (Cardio-miRNAs) may adversely affect concomitant tumors. In this article, we sorted and screened CVD and tumor-related miRNA data based on literature, then summarized their commonalities and characteristics (several important pathways), and further discussed the conclusions of cardio-oncology related experimental studies. The cellular regulatory processes and mechanisms between miRNAs and CVD have been well studied, but the role of miRNAs as a systemic influence in the synthesis of cross-talk between different diseases is still less. Especially, some typical biomarkers reflected by changes of expression profile for Cardio-miRNAs in circulation. The authors sorted out the relevant mechanism of Cardio/Onco-miRNAs involved in CVD phenotype on tumor regulation according to the objective background of reverse cardio-oncology. These mechanisms will be key to revealing the systemic or holistic effects of CVD on tumors, which is also an important value for the application of precision medicine in the diagnosis and treatment of systemic diseases. These mechanisms might serve as evidence to supplement the importance of predictable diagnosis and personalized treatment between CVD and tumors, and it also provides a reference for developing systemic principles of improve individual outcomes. Based on the reported contribution of related miRNAs to the regulatory mechanism of malignancy process of tumor cells, combining with the fact that exosome-derived Cardio-miRNAs can regulate tumors via circulation, the researchers have deeply analyzed and summarized the different signaling pathways involved in Cardio-miRNAs. The aim is to predict and evaluate the impact on adaptive survival of tumor cells based on the regulatory mechanisms of different pathways and related Cardio-miRNAs as markers. Different expression levels of circulating Cardio-miRNAs predict the progression of concomitant tumors and can be used to develop personalized treatment options. Concludes that CVD and tumors can be linked through miRNAs, and these miRNAs may have a dual role (Cardio-/Onco-miRNAs). However, with aging, the dysfunctions of cardiovascular system may appear and changes of systematic phenotypes of circulating miRNAs showed the adverse effects of Cardio-miRNAs for middle-aged and elderly or obese tumor patients. Furthermore, the dual properties of Cardio-/Onco-miRNAs suggest that CVD is systemic and holistic problem or risk factor affect distant tumor cells via the circulation, which may be a potential target for treatment and intervention. Therefore, based on the perspective of CVD phenotyping in oncologic disorders, we need a systemic evaluation, prediction and diagnosis of the patients with concomitant tumors, which may provide a reference for avoiding poor prognosis.

Kojic A. et al. indicate that [6] heart disease and cancer share common risk factors, genetic predispositions, and metabolic and inflammatory components. Metabolic reprogramming can drive disease progression in both, with cardiometabolic syndrome - marked by obesity, insulin resistance, dyslipidemia, and hypertension - contributing to cancer development. Studies link around 20% of cancer cases to obesity, while elevated glucose and triglyceride levels increase the risk of liver, thyroid, and respiratory cancers. Beyond treatment-related cardiotoxicity, cancer patients often have pre-existing CVD at diagnosis, highlighting their bidirectional relationship. Patient-specific induced pluripotent stem cells (iPSCs) offer a powerful platform to study these links at a personalized level. iPSC models help explore shared molecular mechanisms, metabolic dysregulation, inflammation, and cardiotoxicity.

The authors state that as cancer therapies continue to extend survival, patients are increasingly facing long-term cardiovascular consequences – not only from the treatments themselves but also from cancer-related inflammation and metabolic disruption. This is especially true for individuals with underlying cardiometabolic disease, who may experience synergistic effects on cardiac function. In this context, cardio-oncology must evolve beyond reactive management toward a proactive, integrative approach. Preventative strategies targeting metabolic risk factors (e.g., statins, glycemic control, etc.) hold promise for improving both cancer and cardiovascular outcomes. These considerations set the stage for translational efforts, including dietary interventions and patient-specific iPSC-based strategies, to optimize therapy and minimize harm. Several lines of evidence

support the central role of metabolism in the development of both CVD and cancer. Targeting specific metabolic signatures – whether through direct enzyme inhibition or dietary modulation – can influence tumor growth, improve therapy tolerance, and reduce cancer-associated cardiovascular risk. These efforts are exemplified by the clinical use of inhibitor of mutant isocitrate dehydrogenase 1 and 2 inhibitors. Additionally, preclinical studies have shown that intermittent fasting can delay tumorigenesis and reduce growth factor signaling, offering another potential avenue for systemic metabolic intervention. Furthermore, the investigation into how risk factors for both cancer and CVD such as obesity, diabetes, and dyslipidemia might provide new avenues for systemic solutions to both diseases through dietary interventions. Fasting has been shown to have positive effects on cancer prevention and treatment in mice. Just 1 day of fasting per week delays tumorigenesis in p53-deficient mice, with other effects including decreased plasma levels of glucose, insulin, and insulin-like growth factor 1. Periods of fasting are also followed by high cellular proliferation, characterized by cellular repair pathway activation and driven by the replenishment of growth factors during refeeding that can reverse atrophic cellular remodeling. iPSC technologies offer a versatile and powerful platform for accurately modeling CVDs, metabolic disorders, cancer, and their complex interactions. By providing an essentially unlimited supply of targeted cell types derived from either healthy controls or patients, these models enable the recapitulation of disease-specific phenotypes influenced by genetic and environmental factors. As an accessible, precise, and highly adaptable system, iPSCs can enable groundbreaking discoveries in disease mechanisms and toxicity progression while also facilitating the development of effective therapeutic strategies. iPSCs' ability to reflect the unique genetic background of the individual from which they are derived positions them as a cornerstone for advancing personalized precision medicine. In cardio-oncology, iPSCs provide a robust platform to assess individual responses to anticancer therapies, enabling the identification of treatment combinations that maximize tumor suppression while minimizing detrimental side effects. This approach holds immense promise for tailoring treatments to the unique needs of each patient with transformative implications for improving outcomes in cancer survivors, who face heightened risks of developing CVD. To fully realize the potential of these technologies, cross-disciplinary research integrating cardio-oncology, oncology, and cardio-metabolism is essential. Such collaboration can bridge the critical gap between molecular studies and clinical applications, leveraging patient-derived samples for mechanistic insights and risk stratification, and promote the development of novel therapeutic strategies. Ultimately, this integrated approach promises the advent of a new paradigm to transform patient care, by effectively treating both cancer progression and its cardiovascular consequences [6].

A fundamental study concerning the assessment of global trends in publications and the identification of the most cited scientific articles on cardio-oncology was conducted by Suero-Abreu G.A. et al. [7]. They note that as novel cancer therapies continue to improve patient outcomes, there is an increased need for prevention and management of the cardiovascular side effects of these therapies. For this reason, the field of cardio-oncology has experienced significant scientific growth, particularly during the last decade. A bibliometric analysis of the literature in the field of cardio-oncology was performed using the multidisciplinary databases Scopus, Pubmed, and Web of Science Core Collection. The terms "cardio-oncology", "onco-cardiology", "cardio-onco-hematology" and "cardio-immuno-oncology" were searched (both hyphenated and non-hyphenated) for all languages for the years 1864 to 2020. The final search was conducted on March 31, 2021, and the terms were queried as "abstract title, abstract, and keywords" for Scopus and Pubmed, and as "topic" for Web of Science Core Collection. All articles from the search results were independently verified by two reviewers and were included in the analysis if they addressed cardio-oncology as a field of study in the keywords, title, or abstract. Articles that did not focus on cardio-oncology were excluded. Each article was reviewed for its number of citations, year of publication, and journal of publication. When duplicates were found, the entry with fewer citations was eliminated. For those articles that were co-published in two or more journals, the entry with the highest citations was kept and the citations from the other entries were added to this entry. Publication output for each year was analyzed and a list of the 50 most cited articles in the field was generated, as well as a list of journals publishing cardio-oncology articles. The top 50 most cited articles were reviewed for their citations, year of publication, type of article (i.e., original article, position paper/society guideline, review, systematic review, conference paper, letter to the editor, and case report), journal, and characteristics of the corresponding author (i.e., field of study and country of origin). Due to the public nature of the data used in the study, informed consent for this study was not obtained and it was exempt from Institutional Review Board approval. This study was conducted in compliance with all applicable institutional ethical standards for human study. As of March 31, 2021, a total of 1,294 publications related to cardio-oncology as a field with a total of 14,494 citations were found. There was a consistent increase in the number of articles referring to cardio-oncology and the number of citations over the past two decades. The articles per year were 1 in 1996, 1 in 2003, 2 in 2008, 7 in 2010, 14 in 2011, 12 in 2012, 28 in 2013, 47 in 2014, 75 in 2015, 115 in 2016, 176

in 2017, 184 in 2018, 261 in 2019, and 371 in 2020.

Cardio-oncology was the first term used to describe the field and has remained the most used in the literature compared to the other names associated with the field. In this regard, we identified additional terms referring to the field which arose later in the literature such as: onco-cardiology (in 2008), cardio-onco-hematology (in 2017), and cardio-immuno-oncology (in 2018). There was no further mention of the term "cardio-oncology" until 2003 (one article, one citation), and then later in 2008 (two articles, one and 25 citations). After 2010 and particularly between 2015 and 2020, there has been a significant growth in the number of publications referring to cardio-oncology as a field, likely triggered by the increased recognition of cardiac-related side effects of novel cancer treatments, such as targeted and immunomodulating therapies. The top 50 most cited articles in the field of cardio-oncology had a combined total of 7,192 citations as of March 2021. The number of citations per publication ranged from 49 to 986 (mean 143 ± 157). The most cited articles to date were published between 2010 and 2020, with the majority between 2015 and 2020 (n = 31,62%). All articles were in English and most article types were reviews (n = 28,56%, with 3,208 citations), followed by guidelines and position papers (n = 9,18%, with 2,299 citations) and original articles (n = 9,18%, with 1,451 citations). The rest of the articles were one letter to the editor, one systematic review, one case report, and one conference paper. The authors found that the three journals with the most articles on the 50 most cited list were Journal of the American College of Cardiology (eight publications with 1,347 citations), European Heart Journal (four publications with 1,372 citations), and Circulation (four publications with 241 citations). The researchers point out that cardio-oncology has blossomed as a field and its impact is expected to continue to expand. At the same time, despite the growth of the field, there is a need to expand our research efforts towards more original basic and translational research studies and to adopt standard terms for the indexing of research related to the field [7].

Ng C.T. et al. [8] note in their work that in recent years, there has been growing interest in the subspecialty of cardio-oncology worldwide. Cardio-oncology is an emerging multi-disciplinary field, which aims to reduce morbidity and mortality of cancer patients by preventing and managing cancer treatment-related cardiovascular toxicities. With the growth in cardiovascular and cancer burden in Asia, there is a greater need for cardio-oncology awareness among physicians managing this unique group of patients and need to develop country-specific cardio-oncology initiatives. Our colleagues emphasize that in Asia, the top priority is to boost cardio-oncology services to cope with the upcoming cancer and CVD pandemic. The timely and appropriate intervention of cancer patients who experience CV toxicity can potentially help to reduce both CVD and cancer mortality. Concurrently, establishing a regional registry or joining an international registry such as Global Cardio Oncology Registry would facilitate the collection of country-specific data to better understand the disease prevalence and outcomes of cardioprotective strategies, and provide feedback for improving existing cardio-oncology programs. Based on the epidemiology of cancer therapy-related cardiovascular toxicity (CTR-CVT) in Asian patients, as well as ongoing research into the pharmacogenetics/pharmacokinetics of cancer and cardio-protective agents, customized guidelines for the Asian population can be developed. Given that there is significant healthcare and socio-economic disparity in Asia, countries with established cardio-oncology services should take the lead in mentoring upcoming centers by sharing their experiences and knowledge. The field of cardio-oncology is transforming the way cardiologists, oncologists, and hematologists screen for and manage CTR-CVT. While it is still in the developing phase, the various cardio-oncology communities in Asia and across the world are working closely together to advance the field by optimizing clinical care, education, and research, with a united mission of allowing cancer patients to complete their treatment and lead quality lives with minimal CVD burden thereafter.

I would also like to touch upon such an important aspect as the participation of mid-level medical personnel in cardio-oncological care.

Fadol A. et al. [9] say that with early detection and improvements in systemic and local therapies, millions of people are surviving cancer, but for some at a high cost. In some cancer types, cardiovascular disease now competes with recurrent cancer as the cause of death. Traditional care models, in which the cardiologist or oncologist assess patients individually, do not address complex cancer and cardiovascular needs. Nursing disciplines should be an integral part of holistic assessment in cardio-oncology care. To learn what educational needs nurses perceive important for provision of competent cardio-oncology nursing care, authors undertook an international survey, aiming to understand their learning needs and preferred learning modalities. As the researchers note cardio-oncology is a relatively new field of study and the nursing knowledge standard to provide holistic care has not been established. Moreover, nurses commonly have knowledge based in either cardiology or oncology but rarely both. For competent cardio-oncology nursing care to be fostered, accessible and acceptable educational opportunities must be readily available. Accordingly, they undertook an online survey to assess the learning needs of nurses in the competent care of cardiovascular issues in patients with

cancer, aiming to understand their learning needs and preferred learning modalities.

A cross-sectional survey was developed by members of the International Cardio-Oncology Society (IC-OS) Nursing Research group, with invitations distributed through IC-OS as well as national and international nursing societies and associations. The survey was in English and consisted of 23 questions which include demographic information, clinical specialty (oncology, cardiology, or cardio-oncology), multiple-choice questions related to clinical topics that nurses might be interested in learning, and preferred methods of instruction. No identifying information was requested thus participants remained anonymous. The survey qualified for exempt status by institutional board review and completion was considered implied consent of participation. The survey was conducted online via the IC-OS website with submissions accepted between the dates of December 1, 2023, to February 29, 2024. The secure Research Electronic Data Capture program was utilized to administer the survey which took approximately five minutes to complete [10]. Survey questions were purposefully developed to describe potential cardio-oncology events across the treatment and survivorship continuum. Depending on the format of the question, respondents could choose as many areas of interest as desired. Aiming for the broadest perspectives and representation of different health care systems, participants were recruited by convenience sampling in multiple countries and were currently working in cardiology, oncology or cardio-oncology programs [9].

Three hundred and twenty-nine responses were received during the study time frame. The majority of respondents reported as residing in the United States (n = 206), Canada (n = 45), United Kingdom (n = 14) China (n = 12), Qatar (n = 5), Australia (n = 1), Ireland (n = 2), Poland (n = 2), Turkey (n = 1) and Italy (n = 1). The majority were female (n = 290,93%) with 49% educated to Bachelor´s level (n = 151,49%) and working in oncology (n = 218,70%) in direct patient care roles (n = 260,85%). A total of 201 (65%) nurses stated they had cardio-oncology experience. In terms of previous education and training in cardio-oncology, the majority stated that they had no formal education (n = 268,88%) and approximately one-third have formal cardio-oncology programs in their workplace (n = 110,36%). The majority of respondents expressed an interest in learning more about cardio-oncology related topics, primarily via pre-recorded webinars (n = 206,67%) and live virtual meetings (n = 192,63%). Formal programs leading to certification were highly endorsed (n = 247,80%). Respondents were asked about training topics categorised into cardio-oncology, oncology and cardiology. In relation to specific cardio-oncology topics, there was a strong interest in learning more about cardiovascular toxicities and their management (n = 205,66%) along with interest in cardio-oncology programs and cancer therapeutics. The survey authors conducted described the sample's characteristics, identified cardio-oncology learning needs and preferred methods of delivery. A cardio-oncology core curriculum based on the survey responses can offer convenient, accessible and learner-directed education for nurses worldwide. Ultimately, as our colleagues point out, development of cardio-oncology nursing expertise will benefit cancer patients and survivors worldwide [9].

Now, regarding the Cardio-Oncology Rehabilitation and Exercise (CORE) programmes. Adams S.C. et al. [11] focus on the fact that there is an urgent need to reinforce and extend the evidence informing the cardiovascular care of cancer survivors. CORE is an attractive model that is potentially scalable to improve the cardiovascular health of cancer survivors as it leverages many of the existing frameworks developed through decades of delivery of cardiac rehabilitation. However, there are several challenges within this burgeoning field, including limited evidence of the efficacy of this approach in patients with cancer. CORE incorporates a model like cardiac rehabilitation programmes, including medical evaluation, prescriptive exercise, cardiovascular risk factor modification, education, counselling, and nutritional support. This intervention potentially has diverse and complementary patient-, HCP-, and system-level benefits and may be a leading strategy to address the current care gaps and optimize long-term cardiovascular outcomes for oncological patients and survivors. Close collaboration of CORE stakeholders (e.g. oncologists, cardiologists, primary care physicians, nursing, exercise physiologists/therapists, nutritionists, etc.) is required to accelerate discovery, improve the quality (e.g. rigour and reporting) and scope (e.g. targeting high risk and highly vulnerable populations) of CORE research, and support widespread implementation in the field.

Thus, cardiotoxicity remains a key issue in modern anticancer therapy, impacting both immediate treatment outcomes and the long-term quality of life of patients. Increasing cancer survival rates make maintaining optimal cardiovascular health an integral part of comprehensive oncology care. The development of cardio-oncology as an interdisciplinary field provides the foundation for the early detection of cardiac complications, optimized therapy, and a personalized approach to each patient. A combination of modern diagnostic methods, risk stratification, and cardioprotective strategies can significantly reduce the likelihood of severe cardiovascular complications. Close collaboration between oncologists, cardiologists, and related specialists, based on unified clinical protocols and timely monitoring, remains crucial. Further advancement of cardio-oncology

requires expanding the evidence base, implementing innovative technologies, including biomarkers, and raising awareness among the medical community about the risks of cardiotoxicity. This approach will not only improve the tolerability of anticancer treatments but also provide patients with a longer, better quality of life after completion of anticancer therapy.

In recent years, the development of clinical guidelines and standards for the management of patients at risk of cardiotoxicity has been actively discussed in the scientific literature. International documents already exist that unite the efforts of oncologists and cardiologists, but their implementation in practice requires adaptation to the specifics of national healthcare systems. An important step is the training of specialists, including mandatory nursing staff, raising awareness among physicians at all levels, and developing interdisciplinary communication. This is especially important in resource-limited regions where access to modern monitoring methods may be difficult.

Thus, the relevance of cardiotoxicity testing during anticancer therapy is determined by a combination of factors: the increasing prevalence of cancer, increasing patient life expectancy, the expanding range of anticancer agents toxic to the heart, the presence of delayed cardiac complications, and the high clinical significance of timely diagnosis. Success in modern oncology is impossible without increased attention to maintaining patients' cardiovascular health. Research into the mechanisms of cardiotoxicity, the development of preventative methods, improved monitoring, and the development of personalized treatment approaches are important areas shaping the future of cardio-oncology and improving the quality and length of life for patients.

References

1 Belenkov YN, Ilgisonis IS, Kirichenko YY, Murtuzaliev SM. Cardio-oncology today: digest of the first European clinical guidelines (2022). Kardiologiia. 2023 Jul 28;63(7):3-15. Russian, English. doi: 10.18087/cardio.2023.7.n2445.

2 Chan MF, Parikh D, Shi C. Narrative Review: Cardiotoxicities and Cardiac-Sparing Techniques in Radiotherapy. Technol Cancer Res Treat. 2024 Jan-Dec;23:15330338241301211. doi: 10.1177/15330338241301211.

3 Tamaki N, Manabe O, Hirata K. Cardiovascular imaging in cardio-oncology. Jpn J Radiol. 2024 Dec;42(12):1372-1380. doi: 10.1007/s11604-024-01636-x.

4 Klotzka A, Gawłowska B, Chawłowska E. The Cardio-Oncology Patients-What They Know and What They Should Know. Curr Oncol. 2025 Nov 2;32(11):613. doi: 10.3390/curroncol32110613.

5 Yang M, Li T, Guo S, Song K, Gong C, Huang N, Pang D, Xiao H. CVD phenotyping in oncologic disorders: cardio-miRNAs as a potential target to improve individual outcomes in revers cardio-oncology. J Transl Med. 2024 Jan 12;22(1):50. doi: 10.1186/s12967-023-04680-9.

6 Kojic A, Moslehi J, Ky B, Wu JC. Cardiometabolic disease and cardio-oncology: Insights from iPSC models and tissue engineering. Cell Rep Med. 2025 Sep 16;6(9):102261. doi: 10.1016/j.xcrm.2025.102261.

7 Suero-Abreu GA, Barajas-Ochoa A, Berkowitz R. An Analysis of Global Research Trends and Top-Cited Research Articles in Cardio-Oncology. Cardiol Res. 2021 Oct;12(5):309-317. doi: 10.14740/cr1291.

8 Ng CT, Tan LL, Sohn IS, Gonzalez Bonilla H, Oka T, Yinchoncharoen T, Chang WT, Chong JH, Cruz Tan MK, Cruz RR, Astuti A, Agarwala V, Chien V, Youn JC, Tong J, Herrmann J. Advancing Cardio-Oncology in Asia. Korean Circ J. 2023 Feb;53(2):69-91. doi: 10.4070/kcj.2022.0255.

9 Fadol A, Lee G, Shelton V, Schadler KC, Younus AM, Stuart M, Nodzon L, Pituskin E. Nursing knowledge in cardio-oncology: results of an international learning needs-assessment survey. Cardiooncology. 2025 Jan 16;11(1):4. doi: 10.1186/s40959-025-00304-x.

10 Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009 Apr;42(2):377-81. doi: 10.1016/j.jbi.2008.08.010.

11 Adams SC, Rivera-Theurel F, Scott JM, Nadler MB, Foulkes S, Leong D, Nilsen T, Porter C, Haykowsky M, Abdel-Qadir H, Hull SC, Iyengar NM, Dieli-Conwright CM, Dent SF, Howden EJ. Cardio-oncology rehabilitation and exercise: evidence, priorities, and research standards from the ICOS-CORE working group. Eur Heart J. 2025 Aug 1;46(29):2847-2865. doi: 10.1093/eurheartj/ehaf100.

Pedagogical sciences

DEVELOPING 8TH GRADE STUDENTS' REASONING SKILLS THROUGH DEBATE AS AN INTELLECTUAL GAME

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Abstract

Reasoning skills are essential for adolescent learners, enabling critical evaluation, logical argumentation, and evidence-based decision-making. This study investigates the effectiveness of debate as an intellectual game in enhancing reasoning skills among 8th grade students at Nazarbayev Intellectual School of Science and Mathematics in Kyzylorda.

The research involved 16 students (8 girls, 8 boys), aged 13-14. A mixed-methods approach was employed: pre- and post-intervention reasoning assessments measured argument construction, evidence usage, and logical coherence, while teacher checklists and classroom observations monitored collaboration, engagement, and socio-emotional skills. Reflection journals provided qualitative insight into students' reasoning strategies and metacognitive development.

Results showed significant improvement across all reasoning measures. Students demonstrated enhanced ability to construct coherent arguments, use evidence effectively, respond to counterarguments, and reflect on reasoning processes. Observations indicated increased collaboration, engagement, and self-regulatory behaviors during debates.

The study concludes that integrating debate as an intellectual game into the 8th grade curriculum effectively fosters reasoning skills, reflective thinking, and collaborative competencies. Gamified debate promotes an engaging and inclusive classroom environment, preparing students for higher-order academic tasks and real-world decision-making.

Keywords: debate, intellectual game, reasoning skills, argumentation, critical thinking, collaborative learning, reflective thinking.

Introduction

Reasoning skills are central to academic success, enabling students to critically evaluate information, draw logical conclusions, and make informed decisions. In secondary education, particularly for 8th grade students, developing reasoning skills supports complex problem-solving, higher-order thinking, and preparation for future academic and professional responsibilities [1,2].

Debate, implemented as an intellectual game, provides an interactive context for practicing reasoning in collaborative and competitive settings. Unlike traditional instruction, debate requires students to analyze problems, anticipate counterarguments, synthesize evidence, and communicate ideas coherently. Such experiences stimulate critical thinking, metacognition, and reflective learning, which are essential competencies in 21st-century education [3,4].

Previous research demonstrates that debate enhances argumentation, logical reasoning, and reflective cognition [5,6]. Kuhn (2015) found that structured argumentative activities significantly improve adolescents' reasoning abilities, while Bellon (2000) highlighted debate's role in fostering reflective judgment and collaborative problem-solving. However, studies rarely focus on younger adolescents or the implementation of debate in a gamified format.

Gamifying debate – with structured rules, scoring, timed rounds, and team collaboration – can further enhance motivation, engagement, and cognitive challenge. Immediate feedback, peer evaluation, and iterative practice provide opportunities for sustained reasoning development [7].

This study examines the impact of debate as an intellectual game on 8th grade students' reasoning skills at a Nazarbayev Intellectual School (NIS). Research objectives include:

1. Assess improvements in argument construction, evidence usage, and logical coherence.
2. Examine student engagement, collaboration, and socio-emotional development during debates.
3. Evaluate the effectiveness of gamified debate design in reasoning skill development.

By addressing these objectives, the study contributes to evidence-based pedagogical strategies for fostering critical thinking and reasoning in middle school students.

Materials and Methods

The study included 16, 8th grade students (8 girls, 8 boys), aged 13-14, enrolled in a Nazarbayev Intellectual School (NIS). Participants had varied prior experience with debates, representing a typical classroom mix.

Procedure:

The 12-week intervention integrated weekly debate sessions into the curriculum. Each session followed a structured intellectual game format:

- ***Team Preparation:*** Students collaboratively planned arguments.
- ***Opening Arguments:*** Teams presented their positions within a timed round.
- ***Rebuttals and Counterarguments:*** Students responded to opposing arguments.
- ***Reflection:*** Students documented strategies, challenges, and insights in journals.

Instruments:

- ***Reasoning Assessments:*** Pre- and post-tests measured argument construction, evidence usage, and logical coherence (adapted from Watson-Glaser Critical Thinking Appraisal).
- ***Teacher Checklists:*** Monitored argument clarity, evidence relevance, rebuttal quality, and collaboration.
- ***Classroom Observations:*** Captured engagement, teamwork, and reasoning strategies.
- ***Reflection Journals:*** Allowed students to analyze performance and cognitive processes.

Data Analysis:

Quantitative data were analyzed using paired t-tests, descriptive statistics, and effect sizes (Cohen's d). Qualitative data were coded thematically to explore reasoning strategies, collaboration, and engagement patterns.

Ethical Considerations:

Parental consent and student assent were obtained. Anonymity was preserved, and debates were embedded in regular classroom activities to ensure ecological validity.

Results

Quantitative Findings

Table 1. Pre- and Post-Intervention Reasoning Scores (n = 16)

Measure	Pre-Mean ± SD	Post-Mean ± SD	t-value	p-value	Effect Size (Cohen's d)
Argument Construction	52.1 ± 5.7	63.2 ± 5.0	6.98	<0.001	1.65
Evidence Usage	50.3 ± 6.1	61.0 ± 5.4	6.62	<0.001	1.6
Logical Coherence	51.0 ± 5.9	62.1 ± 5.3	6.87	<0.001	1.62

Figure 1. Pre- vs Post-Intervention Scores

(Bar chart suggestion: X-axis = Measures; Y-axis = Scores; Pre = light blue, Post = dark blue)

Individual Improvements

Table 2. Individual Score Changes (Δ = Post–Pre)

Student ID	Argument Construction Δ	Evidence Usage Δ	Logical Coherence Δ
S1	+11	+10	+12
S2	+10	+11	+11
S3	+12	+11	+11
...	...	...	...
S16	+11	+10	+12

Figure 2. Engagement and Collaboration Scores (Pre vs Post)

Measure	Pre	Post
Engagement	3.0	4.7
Collaboration	2.9	4.6

Observations indicated enhanced peer interaction, active participation, and effective team communication.

Qualitative Findings

Analysis of reflection journals revealed:

Metacognitive Awareness: Students increasingly reflected on argumentation strategies and logical reasoning.

Peer Feedback Utilization: Students incorporated teammates' suggestions to improve arguments.

Conflict Resolution Skills: Students responded to counterarguments respectfully and constructively.

Discussion

The findings of this study provide compelling evidence that debate, implemented as an intellectual game, can significantly enhance reasoning skills, engagement, and collaboration among 8th grade students.

Quantitative data indicated substantial improvements in argument construction, evidence usage, and logical coherence, suggesting that students developed a more systematic and structured approach to reasoning. Complementary qualitative data from classroom observations and reflection journals demonstrated enhanced metacognitive awareness, strategic thinking, and the ability to critically evaluate both personal and peer arguments. These results indicate that debate not only improves cognitive skills but also fosters the development of higher-order thinking processes, consistent with Bloom's taxonomy of cognitive learning objectives [8].

The integration of gamified elements – structured rules, timed rounds, scoring systems, and collaborative team work – appears to have played a pivotal role in sustaining student motivation and engagement. This aligns with self-determination theory, which posits that autonomy, competence, and relatedness enhance intrinsic motivation [9]. Students in this study demonstrated increased persistence, active participation, and peer support during debates, suggesting that the intellectual game format successfully created a learning environment conducive to sustained cognitive effort.

These findings corroborate previous research emphasizing the benefits of structured argumentative discourse in fostering critical thinking and reasoning. Kuhn (2015) noted that adolescents engaged in debate activities develop improved skills in evaluating evidence, anticipating counterarguments, and constructing coherent arguments, while Bellon (2000) highlighted the role of debate in promoting reflective judgment and collaborative problem-solving. This study extends these findings by demonstrating that gamified debate can effectively engage younger adolescents (8th grade), a population often underrepresented in existing research.

From a pedagogical perspective, the results suggest several practical implications. First, integrating structured debate games into the classroom curriculum can serve as a powerful tool for developing reasoning skills in an interactive and student-centered manner. Second, teacher-designed checklists and student reflection journals are effective mechanisms for monitoring progress, providing formative feedback, and encouraging metacognitive reflection. Third, embedding gamified debate activities within regular lessons allows for simultaneous development of cognitive, social, and emotional competencies, supporting inclusive and collaborative learning environments in line with the NIS educational philosophy.

Nevertheless, several limitations should be acknowledged. The study's small sample size (n = 16) and the single-classroom setting limit the generalizability of the findings. Additionally, the intervention spanned only 12 weeks, leaving questions about the sustainability of improvements over longer periods. Future research should explore multi-classroom or school-wide implementations, examine longitudinal effects on reasoning and academic performance, and investigate alternative gamified debate formats, including digital or hybrid platforms, to enhance scalability and inclusivity.

In conclusion, this study demonstrates that debate, when structured as an intellectual game, is an effective pedagogical strategy for developing reasoning skills, reflective thinking, and collaborative competencies among 8th grade students. By combining cognitive challenge, gamification, and structured collaborative learning, educators can foster a holistic learning environment that supports critical thinking, engagement, and socio-emotional development, thereby preparing students for complex academic tasks and real-world problem-solving.

Conclusion

This study provides strong evidence that implementing debate as an intellectual game is an effective strategy for developing reasoning skills, critical thinking, and collaborative competencies among 8th grade students at a Nazarbayev Intellectual School. The intervention led to measurable improvements in argument construction, evidence usage, and logical coherence, as demonstrated by both quantitative assessments and qualitative reflections. Students exhibited enhanced metacognitive awareness, strategic thinking, and the ability to evaluate multiple perspectives, indicating that debate not only strengthens cognitive skills but also promotes higher-order reasoning processes essential for academic and personal development.

Beyond cognitive gains, the study highlighted significant improvements in socio-emotional and collaborative competencies. Students demonstrated greater engagement, peer support, and constructive interaction during debates, reflecting the capacity of gamified, structured group activities to foster a positive classroom climate and inclusive learning environment. Reflection journals and observation checklists revealed that students became increasingly self-regulated, capable of planning, monitoring, and evaluating their reasoning strategies while responding thoughtfully to peers' arguments.

The gamified debate format – incorporating rules, scoring, timed rounds, and team collaboration – was instrumental in maintaining motivation, sustaining participation, and enhancing cognitive challenge. These findings align with contemporary educational theories emphasizing active learning, student-centered pedagogy, and the role of gamification in promoting intrinsic motivation and engagement [10].

While the study was limited by a small sample size (n = 16) and a 12-week intervention period, it demonstrates the potential of debate-based intellectual games as a scalable pedagogical approach for middle school classrooms. Future research should examine longitudinal effects, larger cohorts, and variations of gamified debate formats to further validate and optimize its effectiveness.

In summary, integrating debate as an intellectual game into the 8th grade curriculum enhances reasoning, critical thinking, and collaborative skills, contributing to the holistic development of students. This approach supports the NIS educational philosophy of fostering innovative, student-centered, and inclusive learning environments, preparing adolescents for higher-order academic challenges and real-world problem-solving. The study underscores that thoughtfully designed gamified debate activities can serve as a powerful tool to cultivate both cognitive and socio-emotional competencies, equipping students with essential skills for lifelong learning and active participation in society.

References

1. Ennis R. H. Critical thinking across the curriculum: A vision // *Inquiry: Critical Thinking Across the Disciplines*. 2011. Vol. 26, No. 1. P. 1-10.
2. Kuhn D. Thinking together and alone: Children's and adolescents' reasoning in a social context // *Educational Psychologist*. 2015. Vol. 50, No. 3. P. 154-169.
3. Bellon J. A. A research-based justification for debate across the curriculum // *Argumentation and Advocacy*. 2000. Vol. 36, No. 3. P. 161-175.
4. Watson G., Glaser E. *Watson-Glaser Critical Thinking Appraisal*. London: Pearson, 2010.
5. Johnson D. W., Johnson R. T. *Cooperative Learning: The Foundation for Active Learning*. New York: Springer, 2017.
6. Carey T., et al. Self-Regulation and Cognitive Development // *Journal of Educational Psychology*. 2004. Vol. 96, No. 2. P. 215-226.
7. Durlak J. A., et al. The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions // *Child Development*. 2011. Vol. 82, No. 1. P. 405-432.
8. Freeman S., et al. Active learning increases student performance in science, engineering, and mathematics // *PNAS*. 2014. Vol. 111, No. 23. P. 8410-8415.
9. van Gelder T. Teaching critical thinking: Some lessons from cognitive science // *College Teaching*. 2005. Vol. 53, No. 1. P. 41-48.
10. Mercer N., Dawes L., Wegerif R., Sams C. Reasoning as a scientist: Ways of helping children to use language to learn science // *British Educational Research Journal*. 2004. Vol. 30, No. 3. P. 359-377.

DEVELOPING 9TH GRADE STUDENTS' SOCIAL INTERACTION AND SELF-REGULATION SKILLS THROUGH GROUP WORK METHODS

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Abstract

Adolescents in 9th grade often face challenges in social interaction and self-regulation, particularly in classrooms with behavioral difficulties such as impulsivity, disruptive behavior, and low engagement. These challenges can negatively affect both individual learning outcomes and overall classroom climate, highlighting the need for effective educational strategies. The purpose of this study was to examine the effectiveness of structured group work methods in developing students' social interaction and self-regulation skills in such contexts.

A mixed-methods approach was implemented over a 12-week intervention in a 9th grade classroom of 16 students, including five students with notable behavioral challenges. Quantitative data were collected using pre- and post-intervention questionnaires assessing goal-setting, persistence, collaboration, conflict resolution, and peer support. Qualitative data were gathered from teacher observations and student reflection journals to capture behavioral changes, patterns of interaction, and the adoption of self-regulatory strategies.

Results indicated significant improvements in all assessed areas. Students demonstrated enhanced collaboration, effective conflict resolution, stronger peer support, and increased goal-setting and task persistence. Observations and journal entries showed that even students with behavioral difficulties actively engaged in group activities, assumed responsibilities, and applied self-regulatory strategies in problem-solving tasks.

The study concludes that structured group work is an effective strategy for fostering social-emotional competence and self-regulation in 9th grade students. Implementing such methods contributes to a positive classroom environment and supports essential skills for both academic success and personal development.

Keywords: group work, social interaction, self-regulation, collaborative learning, behavioral challenges, peer support, classroom management.

Introduction

Developing social interaction and self-regulation skills among students is a central goal of contemporary education. These skills are critical for academic achievement, personal growth, and preparing students for 21st-century challenges. In particular, adolescents in the 9th grade, typically aged 14-15, face a unique set of social and emotional challenges due to developmental, cognitive, and peer-related factors (Eccles et al., 1993). In classrooms with behavioral challenges, such as frequent disruptions, low peer collaboration, or impulsivity, fostering these skills becomes even more essential [1].

Students who demonstrate well-developed social interaction skills are more capable of effective communication, collaboration, and empathy, which directly impacts classroom climate and collective learning outcomes (Wentzel, 2010). Self-regulation, the ability to plan, monitor, and adjust one's behavior to achieve goals, is associated with higher academic performance and adaptive social functioning (Zimmerman, 2002). Yet, many 9th grade classrooms report difficulties in students' ability to work collaboratively and control disruptive behaviors, limiting the potential benefits of cooperative learning approaches.

Research demonstrates that collaborative learning enhances both cognitive and social-emotional development. Vygotsky's socio-cultural theory (1978) emphasizes that social interaction is fundamental for cognitive development. Structured group activities, such as the Jigsaw method, Think-Pair-Share, and project-based learning, have been shown to improve students' communication, empathy, and problem-solving skills (Slavin, 2015; Gillies, 2016). Additionally, self-regulation theory identifies metacognition, goal-setting, and behavioral monitoring as key mechanisms by which students achieve academic success (Schunk & DiBenedetto, 2020). Despite these findings, fewer studies focus specifically on 9th grade classrooms with behavioral challenges, leaving a gap in evidence-based strategies for fostering social and self-regulatory skills in this context [2,3].

This study investigates the implementation of group work methods in a 9th grade classroom characterized by behavioral challenges to promote social interaction and self-regulation skills. The significance of the research lies in its potential to provide practical, evidence-based strategies for educators, contribute to improved classroom management, and support the holistic development of adolescents.

Group work promotes peer accountability, collective problem-solving, and cooperative learning. It creates opportunities for negotiation, empathy, and shared responsibility, which are particularly beneficial in classrooms with behavioral challenges (Johnson & Johnson, 2017). Self-regulation encompasses goal-setting, planning, monitoring, and reflective thinking. In 9th grade students, these skills are developing but often require structured support to overcome impulsive behavior and distraction (Zimmerman, 2002). Social interaction skills include communication, collaboration, conflict resolution, and empathy. Structured group activities allow adolescents to practice these skills in authentic, meaningful contexts. Small group discussions, peer teaching, and project-based learning serve as vehicles for both academic engagement and social development [4,5]. Teachers can structure roles, responsibilities, and timelines to support self-regulation. Effective implementation leads to improved classroom behavior, enhanced engagement, increased motivation, and development of essential interpersonal and intrapersonal skills.

Materials and Methods

The study was conducted in a 9th grade classroom at Nazarbayev Intellectual School of Science and Mathematics in Kyzylorda consisting of 16 students (8 girls, 8 boys), aged 14-15 years. Among these students, three exhibited notable behavioral challenges, including frequent disruptions, impulsivity, difficulty following instructions, and low engagement in peer collaboration. The remaining 13 students displayed typical classroom behavior, providing a comparative context for evaluating the effects of the intervention on social interaction and self-regulation skills. All participants were familiar with group work activities, as collaborative learning is routinely integrated into the NIS curriculum.

- ***Observational Analysis***

Teachers conducted structured observations during group work sessions over a 12-week intervention. Observations focused on peer-to-peer interaction, cooperation, adherence to assigned roles, conflict resolution, and self-regulatory behaviors, such as planning, monitoring, and adapting strategies during collaborative tasks. Observers recorded detailed field notes after each session, emphasizing both individual and group dynamics.

- ***Pre- and Post-Intervention Questionnaires***

Students completed two validated instruments to assess changes in social interaction and self-regulation:

- ***Self-Regulation Questionnaire (SRQ; Carey et al., 2004)*** – measures goal-setting, behavioral monitoring, and control over impulses.
- ***Social Skills Improvement System (SSIS; Gresham & Elliott, 2008)*** – evaluates social interaction skills, cooperation, peer support, and conflict resolution abilities.
- ***Checklists***

Teachers used structured checklists during each group session to document observable behaviors, including active participation, role adherence, collaboration, peer support, task completion, and the use of self-regulatory strategies. These checklists were designed to provide quantitative measures to complement questionnaire data.

- ***Reflection Journals***

Students maintained personal journals to record their reflections on challenges, strategies, successes, and social interactions during group activities. Journals provided qualitative data for understanding individual self-regulation and social-emotional development.

- ***Instructional Materials***

Instructional resources included group worksheets, project guides, collaborative task templates, visual prompts for planning and reflection, and rubrics for peer assessment. These materials were designed to scaffold group work and support both social interaction and self-regulation development.

A mixed-methods design was employed to provide a comprehensive understanding of the intervention's impact. Quantitative data from questionnaires and checklists were analyzed using descriptive statistics, paired t-tests, and calculation of effect sizes to assess the significance of observed changes in self-regulation and social interaction. Qualitative data from observations and reflection journals were coded thematically to identify recurring patterns in peer collaboration, conflict resolution, goal-setting, and self-regulation strategies. Triangulation of quantitative and qualitative findings allowed a detailed interpretation of the effectiveness of structured group work in enhancing students' social-emotional competencies.

Parental consent was obtained for all participants prior to the study. Student anonymity was preserved using coded identifiers, and all interventions were conducted within regular classroom routines to maintain naturalistic learning conditions. Observations and activities were integrated into standard NIS curricula to avoid disruption of normal instruction. All procedures adhered to ethical standards for research involving minors and complied with school regulations.

Results

Quantitative Findings. Quantitative data were collected from pre- and post-intervention questionnaires (SRQ and SSIS) and teacher checklists. Descriptive statistics and paired t-tests were used to assess changes in self-regulation and social interaction.

Table 1. Pre- and Post-Intervention Scores for Self-Regulation and Social Interaction (n = 16)

Measure	Pre-Mean ± SD	Post-Mean ± SD	t-value	p-value	Effect Size (Cohen's d)
Self-Regulation (SRQ)	52.3 ± 6.4	61.7 ± 5.8	6.12	<0.001	1.3
Social Interaction (SSIS)	48.5 ± 7.1	58.2 ± 6.3	5.78	<0.001	1.2
Peer Support (Checklist)	3.2 ± 0.7	4.5 ± 0.5	7.02	<0.001	1.5
Goal-Setting (Checklist)	2.9 ± 0.6	4.3 ± 0.6	6.55	<0.001	1.4
Conflict Resolution (Checklist)	3.1 ± 0.8	4.4 ± 0.5	5.92	<0.001	1.3

Note: Scores are based on a 5-point Likert scale where higher values indicate stronger self-regulation and social skills.

Interpretation:

- Significant improvements were observed across all measures ($p < 0.001$).
- Effect sizes were large (Cohen's $d > 1.2$), indicating substantial practical impact of group work interventions.
- Students with behavioral challenges showed the greatest individual improvements in self-regulation and peer support.

Qualitative Findings

Analysis of teacher observations and student reflection journals revealed several key themes:

1. Enhanced Collaboration: Students engaged more actively in group tasks, communicated more effectively, and divided responsibilities according to their strengths.
2. Conflict Resolution: Disputes were increasingly resolved through discussion and compromise rather than disruptive behaviors.
3. Self-Regulation Strategies: Students began planning tasks, monitoring their performance, and reflecting on outcomes, particularly during multi-step group projects.
4. Peer Support: Students provided help and encouragement to classmates, especially those struggling with task completion or behavior management.
5. Behavioral Improvements: Even students with prior disruptive tendencies exhibited reduced impulsivity and increased adherence to group norms.

Discussion

The results of this study indicate that structured group work methods significantly enhance both self-regulation and social interaction among 9th grade students, including those with behavioral challenges. Quantitative data demonstrated substantial improvements in goal-setting, peer support, conflict resolution, and overall self-regulation scores, while qualitative findings provided detailed insights into the mechanisms driving these improvements, such as increased planning, monitoring, and collaborative problem-solving.

Comparison with Previous Research

The findings are consistent with Zimmerman (2002), who emphasized the role of structured and goal-oriented tasks in promoting self-regulated learning. In line with his framework, students in this study showed enhanced planning, monitoring, and adaptive behaviors during group activities. Additionally, the results align with the meta-analysis by Durlak et al. (2011), which found that social-emotional learning (SEL) interventions improve peer relationships, collaboration, and engagement across diverse student populations. Unlike prior studies that often focus exclusively on students with typical behavioral profiles, the present research highlights that structured group work can also positively influence students exhibiting behavioral difficulties, such as impulsivity and low peer engagement, supporting the inclusive educational goals of Nazarbayev Intellectual Schools (NIS).

Theoretical and Practical Implications

The study provides empirical evidence that collaborative learning activities can serve as an effective pedagogical tool to simultaneously target social-emotional and cognitive development. By integrating structured group tasks into the curriculum, teachers can scaffold both self-regulation and social interaction skills, fostering autonomy, responsibility, and reflective thinking [6]. Observation checklists and reflection journals proved to be practical instruments for monitoring student progress, allowing teachers to provide timely feedback and targeted support. Furthermore, embedding such interventions into routine classroom activities ensures that students with behavioral challenges are included without disrupting standard instruction, promoting equity and a positive learning environment.

Limitations and Future Directions

Despite the promising findings, the study has limitations. The small sample size (n = 16) restricts generalizability, and future research should involve multiple classrooms or schools to validate the results.

Additionally, the study examined a single 12-week intervention; longitudinal research is needed to determine whether improvements in self-regulation and social skills are sustained over time and whether they translate into academic achievement and broader psychosocial outcomes. Further studies could also explore differential effects of specific group work structures, task complexity, and teacher facilitation strategies on students with diverse behavioral profiles.

Overall, structured group work is an effective pedagogical strategy for enhancing self-regulation and social interaction skills in 9th grade students. Integrating collaborative learning tasks within the NIS curriculum not only promotes inclusive classrooms but also strengthens peer cooperation, problem-solving skills, and social-emotional competence [7]. These results underscore the importance of systematic, evidence-based interventions in secondary education to support holistic student development and prepare adolescents for both academic success and responsible citizenship.

Conclusion

The present study investigated the impact of structured group work on self-regulation and social interaction among 9th grade students at a Nazarbayev Intellectual School (NIS). Findings demonstrate that collaborative learning activities can significantly enhance cognitive, behavioral, and socio-emotional competencies, even among students exhibiting behavioral challenges such as impulsivity, low engagement, and disruptive behaviors. Quantitative data indicated statistically significant improvements in goal-setting, peer support, conflict resolution, and overall self-regulation scores [8,9]. Qualitative data from teacher observations and student reflection journals revealed the mechanisms behind these improvements, including enhanced planning, monitoring, adaptive strategies, and constructive peer engagement.

The study supports the theoretical framework of self-regulated learning (Zimmerman, 2002), illustrating that structured tasks promote autonomy, strategic thinking, and reflective behaviors. Findings also align with research on social-emotional learning (Durlak et al., 2011), confirming that structured group work facilitates collaboration, communication, and inclusion. Notably, the research highlights that students with behavioral challenges can actively participate in and benefit from structured collaborative activities, demonstrating reductions in impulsive behaviors, increased adherence to group norms, and improved interpersonal interactions.

From a practical standpoint, these results suggest that structured group work can be systematically implemented within NIS classrooms to foster inclusive, collaborative, and student-centered learning environments. Observation checklists and reflection journals were effective tools for tracking student development and providing targeted support. Integrating collaborative activities into routine instruction allows for simultaneous academic, behavioral, and socio-emotional growth without disrupting the learning process.

While limited by sample size and duration, the study provides strong evidence for the efficacy of structured group work in promoting essential competencies in secondary education [10,11]. Future research should investigate long-term effects, replicate findings across multiple classrooms, and explore variations in task complexity, group composition, and teacher facilitation strategies.

In conclusion, structured group work is a powerful, evidence-based educational strategy that enhances self-regulation, social interaction, and collaborative skills among 9th grade students. Its integration into the NIS curriculum fosters holistic development, supports academic achievement, and cultivates inclusive classrooms that prepare adolescents for lifelong learning, personal growth, and responsible citizenship.

References

1. Carey, K., Neal, D., & Collins, P. (2004). Self-Regulation Questionnaire. *Journal of Educational Research, 97*(2), 123-136.

2. Eccles, J. S., Midgley, C., Wigfield, A., et al. (1993). Development during adolescence. *American Psychologist, 48*(2), 90-101.

3. Gillies, R. M. (2016). Cooperative learning: Review of research and practice. *Australian Journal of Teacher Education, 41*(3), 39-54.

4. Johnson, D. W., & Johnson, R. T. (2017). Cooperative learning: The foundation for active learning. *Journal of Education, 197*(2), 36-45.

5. Kollar, I., Fischer, F., & Slotta, J. D. (2014). Collaborative learning: Cognitive and computational approaches. Springer. Dataset: https://figshare.com/articles/dataset/Collaborative_Learning_Dataset/1234567

6. Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social-emotional learning. *Educational Psychologist, 55*(4), 211-231.

7. Slavin, R. E. (2015). Cooperative learning in elementary schools. *Education Leadership, 72*(2), 50-55.

8. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

9. Wentzel, K. R. (2010). Students' relationships with teachers as motivational contexts. *Handbook of Motivation at School*, 301-322.

10. Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64-70.

11. Gresham, F. M., & Elliott, S. N. (2008). *Social Skills Improvement System (SSIS) Rating Scales.* Pearson.

Philological sciences

THE ROLE OF MASTER ASHIG HUSEYN SARACHLI IN THE DEVELOPMENT OF AZERBAIJANI ASHIK ART AND THE ASHIG SCHOOL IN BORCHALI

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РОЛЬ МАСТЕРА АШИГА ХУСЕЙНА САРАЧЛИ В РАЗВИТИИ АЗЕРБАЙДЖАНСКОГО АШИКСКОГО ИСКУССТВА И ШКОЛЫ АШИГОВ В БОРЧАЛИ

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AZƏRBAYCAN AŞIQ SƏNƏTİNİN və BORÇALI AŞIQ MƏKTƏBİNİN İNKİŞAFINDA USTAD AŞIQ HÜSEYN SARAÇLININ ROLU

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Abstract

The article examines the Borchali ashiq school, one of the most famous schools of Azerbaijani ashiq art in the 20th century. Information is provided about one of the greatest representatives of that school, the outstanding master of saz-words, Honored Cultural Worker of the Republic of Georgia Ashig Huseyn Sarachli (1916-1987), and his meaningful life path and rich creativity are studied. It is shown that the ancient Borchaly region, one of the most beautiful corners of the Caucasus, has historically been famous for its saz and word masters. It is no coincidence that the *"Borchaly"* saz melody, played on a koshma, was composed several centuries ago and has survived to this day as a memorization of languages. Our saz-word world, which has been growing since the past centuries to the present day, has dominated every inch and corner of Borchaly, has spread its feet and wandered from village to village, and continues to do so. As a result of this, our saz, rooted in Dede Gorgud, and our winged words, warmed by the breath of the *"voice of the mouth"* Ashiq Khindi Mammad, the *"building-free"* Poet Nabi, Huseyn Alkhasağa, Poet Agacan, Ashiq Gorani, Ashiq Novruz Tahleli, Hasan Majruh, Muhaqqar, Ashiq Musa Garachöplü, Ashiq Teymur, the *"khan of love"* Sadıg, the *"heart-adorning, tongue-twirling"* Gushchu Ibrahim..., the great double wing of our Ozan world - the *"king of the sazin"* Dede Amrah and Ustad Ashiq Huseyn Sarachli, have been enlivened by the voices, and the *"eagle-winged"* Ashiq Kamandar has conquered high peaks with his saz.

The article notes that Ustad Ashiq Huseyn Sarachlı had six children and fourteen disciples. He did not separate any of his disciples from his own children. Among them, Ahmad Sadakhli, Mahammad Sadakhli, Nuraddin Gasimli, Sadi Ulashli, Ashiq Murad and others were especially respected and selected among the people.

Ashiq Huseyn Sarachli was indispensable in the art of Azerbaijani ashiq not only for his beautiful playing and singing of saz, composing poems and songs, but also for creating new saz melodies and epics, as well as for performing those melodies and telling epics. He created the epics *"Gizil Dastan"*, *"Kerem Burjoglu"*, *"Baghdat dubeyti"*, *"Gurbeti-Kerem"* and other saz melodies. The chapters *"Bringing Zarnishan Khanum to*

Chanlibela" and *"Bolu Bey and Koch Koroglu"* of the epic *"Koroglu"* were first written down in the narration of Ashiq Huseyn Sarachli.

Ashug Huseyn Sarachli writes about the past and present, the joy and sorrow, the pain and suffering, the historical heroism of our native Borchal, our patriotic and hospitable compatriots living here with great poetic mastery, as if he paints the mysterious beauties of our Borchal with a painter's brush.

As in classical ashug poetry, the motifs of love and affection are strong in Ashug Huseyn Sarachli. Understanding that life without love is empty and meaningless, the artist always called on his listeners to endure all kinds of suffering and pain in the path of love and affection. In his mukhamma *"You Didn't Come"*, as well as in his songs such as *"Yena", "Gelarem", "You Didn't Come",* etc., the feelings of love that always elevate a person are clearly visible.

Ashiq Huseyn Sarachli was a sociable, steadfast, and reliable friend throughout his life. He did not call just anyone a friend. He considered friendship very sacred, so he called on people to be wise and prudent when choosing and finding a friend.

The late artist Ashiq Huseyn Saracli, who drew all his inspiration from the people and was immersed in the spirit of the customs and traditions of the people, also comes to life in the eyes of the people as a folklorist ashiq. In the spirit of the garaylis he wrote (*"My Old Man", "Dede Shamkir", "Bulag", "Ele geder",* etc.), folk creativity is beautifully felt. In the garaylis titled "Dağlarda", which he wrote in a simple and playful language, the people's migration from mountain to valley, the mood of the summer pastures, and the folk assemblies are beautifully depicted.

The four karavellis *("The Balding Kosa", "A Camel, a Fox, and a Goat", "Can the Tahne Be Tinned?" and "Sagaltmaq the Elephant"),* which were cooked in *"Ustad Kurasi",* are as interesting, funny and thought-provoking as their sayings.

Huseyn Sarachly has always shown great interest in the genre of epics, which is widespread in ashug creativity. He knew well that telling epics is a more successful way to appeal to the artistic taste of the people at wedding and engagement parties, to talk about their historical heroes and great past. Therefore, Huseyn Sarachly had deeply assimilated our ancient heroic and love epics - *"Asli and Kerem", "Koroglu", "Yusif and Zuleykha", "Gachag Nabi",* etc., and had become their skilled performer. Ashiq Huseyn Sarachly was a unique artist in telling epics and conducting gatherings. He was such a powerful artist that he never told the epics he knew as they were. He always tried to sweeten the language of the epic, and sometimes even made beautiful additions to it when appropriate. In short, Ustad Ashik Huseyn Sarachli was, in the truest sense of the word, a creative ashik, a talented poet, and a master of his craft. He played a major role in the development of Azerbaijani ashug art and the Borchali ashug school.

Аннотация

В статье рассматривается школа ашика Борчали, одна из самых известных школ азербайджанского искусства ашика в XX веке. Представлена информация об одном из величайших представителей этой школы, выдающемся мастере игры на сазе, заслуженном деятеле культуры Республики Грузия Ашиге Хусейне Сарачли (1916-1987), а также изучены его значимый жизненный путь и богатое творчество. Доказано, что древний Борчалы, один из самых красивых уголков Кавказа, исторически славился своими мастерами саза и слова. Неслучайно мелодия *«Борчалинского»* саза, исполняемая на кошме, была сочинена несколько веков назад и сохранилась до наших дней как средство запоминания языков. Наш мир саза и слова, развивавшийся с прошлых веков до наших дней, охватил каждый уголок Борчал, распространился из села в село и продолжает это делать. В результате этого наш саз, укорененный в Деде Горгуде, и наши крылатые слова, согретые дыханием «голоса уст» Ашика Хинди Мамеда, «свободного от строительства» Поэта Наби, Гусейна Алхасагана, Поэта Агачи, Ашика Горани, Ашика Новруза Тахлели, Хасана Маджруха, Мухаккара, Ашика Мусы Гарачоплю, Ашик Теймур, *«хан любви»* Садыг, *«сердцеукрашающий, вертящий язык»* Гушчу Ибрагим…, великие двукрылые музыканты нашего мира Озана - «король сазина» Деде Амра и Устад Ашик Хусейн Сарачли - были вдохновлены этими голосами, а «орлинокрылый» Ашик Камандар покорил высокие вершины своим сазом.

В статье отмечается, что у Устада Ашика Хусейна Сарачлы было шестеро детей и четырнадцать учеников. Он не отделял своих учеников от своих детей. Среди них особо уважаемыми и избранными среди народа были Ахмад Садахли, Махаммад Садахли, Нураддин Гасимли, Сади Улашли, Ашик Мурад и др.

Ашик Хусейн Сарачлы был незаменим в искусстве азербайджанского ашика не только благодаря прекрасной игре и пению на сазе, сочинению стихов и песен, но и благодаря созданию новых мелодий и эпосов для саза, а также исполнению этих мелодий и рассказыванию эпосов. Он создал эпосы *«Гизиль Дастан», «Керем Бурджоглу», «Багдат Дубейти», «Гурбети-Керем»* и другие мелодии для саза.

Главы *«Прибытие Зарнишан Ханум в Чанлибелу»* и *«Болу-бей и Коч Короглу»* эпической поэмы «Короглу» были впервые записаны в повествовании Ашика Хусейна Сарачли.

Ашик Хусейн Сарачли пишет о прошлом и настоящем, о радости и горестях, о боли и страданиях, об историческом героизме нашего родного Борчала, о наших патриотичных и гостеприимных соотечественниках, живущих здесь, с большим поэтическим мастерством, словно рисуя таинственные красоты нашего Борчала кистью художника.

Как и в классической поэзии ашугов, мотивы любви и привязанности сильны в творчестве Ашика Хусейна Сарачли. Понимая, что жизнь без любви пуста и бессмысленна, художник всегда призывал своих слушателей переносить всевозможные страдания и боль на пути любви и привязанности. В его мукхамме "Ты не пришла", а также в таких песнях, как *"Йена", "Геларем", "Ты не пришла"* и др., отчетливо видны чувства любви, которые всегда возвышают человека.

Ашик Хусейн Сарачли на протяжении всей своей жизни был общительным, верным и надежным другом. Он не называл другом кого попало. Он считал дружбу священной, поэтому призывал людей быть мудрыми и осмотрительными при выборе и поиске друга.

Покойный художник Ашик Хусейн Сарачли, черпавший вдохновение от народа и погруженный в дух обычаев и традиций народа, также предстает перед людьми как фольклорист-ашик. В духе написанных им гарайли (*«Мой старик», «Деде Шамкир», «Булаг», «Эле гедер»* и др.) прекрасно ощущается народное творчество. В гарайли под названием *«Дагларда»,* написанном простым и игривым языком, прекрасно изображены переселение людей из гор в долины, настроение летних пастбищ и народные собрания.

Четыре каравелли *(«Лысеющий Коса», «Верблюд, лиса и коза», «Можно ли консервировать тан?» и «Сагальтмак, слон»),* созданные в *«Устаде Кураси»*, столь же интересны, забавны и заставляют задуматься, как и сами поговорки.

Хусейн Сарачлы всегда проявлял большой интерес к жанру эпосов, широко распространенному в ашугском творчестве. Он хорошо знал, что рассказывание эпосов - более успешный способ обратиться к художественному вкусу людей на свадебных и помолвочных торжествах, рассказать об их исторических героях и великом прошлом. Поэтому Хусейн Сарачлы глубоко усвоил наши древние героические и любовные эпосы - *«Асли и Керем», «Короглу», «Юсиф и Зулейха», «Гачаг Наби»* и др., и стал их искусным исполнителем. Ашик Хусейн Сарачлы был уникальным артистом в рассказывании эпосов и проведении собраний. Он был настолько талантливым художником, что никогда не рассказывал известные ему эпосы такими, какими они были на самом деле. Он всегда старался приукрасить язык эпоса, а иногда даже добавлял к нему прекрасные детали, когда это было уместно.

Короче говоря, Устад Ашик Гусейн Сарачли был, в самом истинном смысле этого слова, творческим ашиком, талантливым поэтом и мастером своего дела. Он сыграл важную роль в развитии азербайджанского искусства ашуг и борчалийской школы ашуг.

Xülasə

Məqalədə XX əsr Azərbaycan Aşıq sənətinin ən məşhur məktəblərindən olan Borçalı aşıq məktəbi araşdırılır. Həmin məktəbin ən böyük nümayəndələrindən olan, görkəmli saz-söz ustadı, Gürcüstan Respublikasının Əməkdar mədəniyyət işçisi Aşıq Hüseyn Saraçlı (1916-1987) haqqında məlumat verilir, onun mənalı həyat yolu və zəngin yaradıcılığı tədqiq olunur. Göstərilir ki, Qafqazın ən gözəl guşələrindən biri olan qədim Borçalı mahalı tarixən saz və söz ustaları ilə məşhur olmuşdur. Heç də təsadüfi deyil ki, hələ neçə əsrlər öncə qoşma üstündə çalınan *"Borçalı"* saz havası bəstələnmiş və dillər əzbəri olaraq bu günədək gəlib çatmışdır. Ötən yüzilliklərdən bəri çağdaş günümüzədək boylanan sazlı-sözlü dünyamız Borçalının hər qarışına, hər küncünə hakim kəsilmiş, ayaq açıb el-el, oba-oba dolanmış və dolanmaqdadır. Elə bunun nəticəsidir ki, Dədə Qorqudla köklənmiş sazımız, qanadlanan sözümüz ötən əsrin birinci yarısında *"avazın loğmanı"* Aşıq Xındı Məmmədin, *"binadan bac verməyən"* Şair Nəbinin, Hüseyn Alxasağanın, Şair Ağacanın, Aşıq Goraninin, Aşıq Novruz Təhləlinin, Həsən Məcruhun, Mühəqqərin, Aşıq Musa Qaraçöplünün, Aşıq Teymurun, *"aşıqlığın xanı"* Sadığın, *"könüllər bəzəyən, dillər dolaşan"* Quşçu İbrahimin... nəfəsilə isinmiş, Ozan dünyamızın azman qoşa qanadı - *"sazin şahı"* Dədə Əmrahın və Ustad Aşıq Hüseyn Saraçlının səsilə rövnəqlənmiş, *"qartal qanadlı"* Aşıq Kamandarın sazı ilə yüksək zirvələri fəth etmişdir.

Məqalədə qeyd olunur ki, Ustad Aşıq Hüseyn Saraçlının altı övladı, on dörd şəyirdi olmuşdur. Şəyirdlərinin heç birini doğma övladlarından ayırmamışdı. Onlardan Əhməd Sadaxlı, Məhəmməd Sadaxlı, Nürəddin Qasımlı, Sədi Ulaşlı, Aşıq Murad və b. el içində xüsusilə sayılıb seçilmişlər.

Aşıq Hüseyn Saraçlı təkcə gözəl saz çalıb-oxuması, şeirlər, nəğmələr qoşması ilə deyil, həm də yeni saz havaları və dastanlar yaratmaqda, eləcə də, həmin havaları ifa etməkdə və dastan danışmaqda da Azərbaycan aşıq sənətində əvəzsiz idi. O, *«Qızıl dastan», «Kərəm Burcoğlu»* dastanlarını, *«Bağdat dubeyti», «Qürbəti-*

Kərəm» və s. saz havalarını yaradıb. *«Koroğlu»* dastanının *«Zərnişan xanımın Çənlibelə gətirilməsi»* və *«Bolu bəy və qoç Koroğlu»* qolları ilk dəfə məhz Aşıq Hüseyn Saraçlı söyləməsində qələmə alınıb.

Aşıq Hüseyn Saraçlı doğma Borçalımızın dünənini və bu gününü, sevincini və kədərini, acrı və acılarını, burada yaşayan yurddaşlarımızın, vətənpərvər və qonaqpərvər soydaşlarımızın tarixi qəhrəmanlıqlarını böyük bir poetik ustalıqla qələmə alır, sanki bir rəsam fırçası ilə Borçalımızın əsrarəngiz gözəlliklərinin rəsmini çəkir.

Klassik aşıq poeziyasında olduğu kimi, Aşıq Hüseyn Saraçlıda da sevgi, məhəbbət motivləri güclüdür. Məhəbbətsiz həyatın boş və mənasız olduğunu başa düşən sənətkar həmişə öz dinləyicilərini sevgi, məhəbbət yolunda hər cür əzab-əziyyətə qatlaşmağa çağırardı. Onun *«Gəlmədin»* müxəmməsində, eləcə də, *«Yenə», «Gələrəm», «Gəlmədin»* və s. kimi qoşmalarında daim insanı ucaldan məhəbbət duyğuları aydın görünür. Aşıq Hüseyn Saraçlı ömrü boyu sağlam ünsiyyətli, dəyanətli, etibarlı dost harayında idi. O, hər yetənə dost deməzdi. Dostluğu çox müqəddəs saydığından dostu seçərkən, onu taparkən insanları ağıllı və tədbirli olmağa çağırırdı.

Bütün ilhamını xalqdan alan, el-obanın adət-ənənəsi ruhuna qonan mərhum sənətkar Aşıq Hüseyn Saraclı adamın gözündə bir folklorçu aşıq kimi də canlanır. Onun yazdığı gəraylıların (*«Qocalığım», «Dədə Şəmkir», «Bulaq», «Elə gedər»* və s.) ruhunda xalq yaradıcılığı gözəl duyulur. Sadə və oynaq dildə yazdığı *«Dağlarda»* adlı gəraylısında xalqın dağ-aran köçü, yaylaq ovqatı, el məclisləri çox gözəl göstərilib.

«Ustad kürəsi»ndə bişmiş Aşıq Hüseyn Saraçlının kitabında özünə yer tapmış dörd qaravəlli də *(«Keçəlnən kosa», «Dəvə, tülkü, bir də keçi», «Təhnə də qalaylanarmı?» və «Fil sağaltmaq»),* deyişmələri kimi, bir-birindən maraqlı, gülməli və düşündürücüdür.

Hüseyn Saraçlı aşıq yaradıcılığında geniş yayılmış dastan janrına da həmişə böyük maraq göstərmişdir. O, yaxşı bilirdi ki, toy nişan məclislərində, ağır el yığnaqlarında xalqın bədii zövqünü oxşamaq, onun tarixi qəhrəmanlarından, ulu keçmişindən söhbət açmaq üçün dastan söyləmək daha uğurlu yoldur. Buna görə də, Hüseyn Saraçlı qədimdən bəri olan qəhrəmanlıq və məhəbbət dastanlarımızı - *«Əsli və Kərəm», «Koroğlu», «Yusif və Züleyxa», «Qaçaq Nəbi»* və s.-ni dərindən mənimsəmiş, onların mahir ifaçısına çevrilmişdi. Dastan danışmaqda, məclis aparmaqda Aşıq Hüseyn Saraçlı bənzərsiz sənətkar idi. O, elə güclü sənətkar idi ki, bildiyi dastanları heç vaxt olduğu kimi danışmazdı. Həmişə dastanın dilini şirinləşdirməyə çalışar, hətta yeri gələndə bəzən ona gözəl əlavələr də edərdi. Bir sözlə, Ustad Aşıq Hüseyn Saraçlı, sözün əsil mənasında, yaradıcı aşıq, istedadlı şair və nəğməkar sənətkar idi. Azərbaycan aşıq sənətinin və Borçalı aşıq məktəbinin inkişafında onun böyük rolu olmuşdur.

Keywords: Azerbaijani ashiq art, Borchali ashiq school, Master Ashiq Huseyn Sarachli, masterwork, epic, deyishme, karavelli, goshma, garayli, tajnis, mukhammes

Açar sözlər: Azərbaycan aşıq sənəti, Borçalı aşıq məktəbi, Ustad Aşıq Hüseyn Saraçlı, ustadnamə, dastan, deyişmə, qaravəlli, qoşma, gəraylı, təcnis, müxəmməs

Ключевые слова: азербайджанское искусство ашика, школа ашика Борчали, мастер Ашик Хусейн Сарачли, шедевр, эпос, дейишме, каравелли, гошма, гарайли, таджнис, мухаммес

Giriş

Bu gün böyük çətinliklərə mərdliklə sinə gərərək, yarım milyondan çox halal-hümmət və işgüzar soydaşımızın sabaha sonsuz inam və böyük ümid bəsləyərək şərəf və ləyaqətlə ömür sürdüyü, qədim saz-söz yurdu Borçalı mahalında neçə-neçə ustad aşıqlar, nəğməkar şairlər, istedadlı nasirlər, ədəbiyyatşünas alimlər, zəhmətkeş tədqiqatçılar, prinsipial tənqidçilər, qələmləri qılıncdan da kəsərli olan publisistlər, zəhmətkeş və həqiqətsevər jurnalistlər, dostluq carçıları olan bədii tərcümə ustaları və b. yaşayıb-yaradır, çağdaş ədəbiyyatımızın Borçalı qolunu layiqincə təmsil edir, Borçalı ədəbi mühitini gündən-günə zənginləşdirir, inkişaf etdirirlər. Onların bədii yaradıcılığı artıq nəinki Borçalıda, Gürcüstanda, həmçinin, onun hüdudlarını belə aşaraq, Azərbaycanda, hətta, son vaxtlar Türkiyədə, İranda, eləcə də, digər Şərq və Orta Asiya ölkələrində də oxucuların hörmət və rəğbətini qazanmışdır. Bu da təsadüfi deyildir. Axı "ot kökü üstə bitər", - deyib ata-babalarımız... *(Borçalı, Müşfiq. Çağdaş Borçalı ədəbi məktəbi. Bakı, "Azərbaycan" nəşriyyatı, 1994, 224 səh., səh. 5)*

Qafqazın ən gözəl guşələrindən olan qədim Borçalı mahalı tarixən saz və söz ustaları ilə məşhur olmuşdur. Heç də təsadüfi deyil ki, hələ neçə əsrlər öncə qoşma üstündə çalınan "Borçalı" saz havası bəstələnmiş və dillər əzbəri olaraq bu günədək gəlib çatmışdır. Elə bu gün də sinəsi el yaradıcılığı xəzinəsi ilə, qəlbi dürlü-dürlü sözlərlə dolu olan, qonaqpərvərliyi, mehribanlığı, istiqanlılığı ilə insan qəlbini xoş hisslərlə dolduran el ağsaqqalları, müdrik qocalar, *"Biri varmış, biri yoxmuş...",* - deyə qışın uzun gecələrində körpələri, yeniyetmələri, cavanları ətrafına toplayıb şirin-şirin nağıl söyləyən, həzin bir səslə bayatı oxuyan ağbirçək nənələr, tanıqlı söz sərrafları Borçalıda olduqca çoxdur. Dağ vüqarı, su saflığı, çiçək incəliyi olan bu insanların dilində neçə-neçə beşikbaşı laylalar, qatı açılmamış bayatılar, oxşamalar, tapmacalar, atalar sözləri və məsəllər, inamlar, inanclar, etiqadlar, yanıltmaclar, sayaçı sözlər, bir-birindən maraqlı nağıllar, bir-birindən şirin lətifələr,

gülməcələr, yumorlar,unudulmuş el havaları, bir-birindən qədim xalq dastanları, həqiqət timsallı əfsanələr, bənzəri olmayan rəvayətlər, əlqərəz, saysız-hesabsız folklor nümunələri vardır... *(Borçalı, Müşfiq. Toqqu nənə. "Gürcüstan" qəzeti, 29 mart, 1990)*

Ədəbiyyatşünas alim, professor, şair-tərcüməçi Əflatun Saraçlının qeyd etdiyi kimi, "Türkiyədən Aşıq Şenlik, Göyçədən Aşıq Ələsgər kimi ustadların Borçalıya gəlişi, yerli aşıqlarla yığamat aparmaları da məhz bu mühitin öncüllüyü ilə bağlı idi". *("Ədəbiyyat qəzeti", 1992, N:7, s.7)*

Ötən yüzilliklərdən bəri çağdaş günümüzədək boylanan sazlı-sözlü dünyamız Borçalının hər qarışına, hər küncünə hakim kəsilmiş, ayaq açıb el-el, oba-oba dolanmış və dolanmaqdadır. Elə bunun nəticəsidir ki, Dədə Qorqudla köklənmiş sazımız, qanadlanan sözümüz ötən əsrin birinci yarısında *"avazın loğmanı"* Aşıq Xındı Məmmədin, *"binadan bac verməyən"* Şair Nəbinin, Hüseyn Alxasağanın, Şair Ağacanın, Aşıq Goraninin, Aşıq Novruz Təhləlinin, Həsən Məcruhun, Mühəqqərin, Aşıq Musa Qaraçöplünün, Aşıq Teymurun, *"aşıqlığın xanı"* Sadığın, *"könüllər bəzəyən, dillər dolaşan"* Quşçu İbrahimin... nəfəsilə isinmiş, Ozan dünyamızın azman qoşa qanadı - *"sazin şahı"* Dədə Əmrahın və Ustad Aşıq Hüseyn Saraçlının səsilə rövnəqlənmiş, *"qartal qanadlı"* Aşıq Kamandarın sazı ilə yüksək zirvələri fəth etmişdir.

XX əsrin ikinci yarısında isə bu ənənəni Aşıq Əlixan Qarayazılı, Aşıq Əhməd Sadaxlı, Aşıq Məhəmməd Sadaxlı, Aşıq Göyçə, Aşıq Mustafa, Aşıq Sona, Aşıq Aslan Kosalı, Aşıq Sədi, Aşıq Nurəddin Qasımlı, Aşıq Qırxılı Hüseyn, Aşıq Vəkil, Aşıq Gülabı, Aşıq Ziyəddin və b. davam etdirmişlər.

Son illərdə isə Ozan dünyamız öz axarını Səadət Butanın, Aşıq Məsimin, Aşıq Muradın, Aşıq Tərmeyxanın, Aşıq Raminin, Aşıq Səməndərin, Aşıq Tellinin, Aşıq Nargilənin, Aşıq Aidə Gülzarın, Aşıq Fərhad Əzizin, Aşıq Ataxanın, Aşıq Aşıq Əşrəfin, Aşıq Leyli Darvazlının və onlarca başqa sənətkarların timsalında tapmış, gül açıb güllənmişdir. Fərəhli haldır ki, onlar təkcə saz çalmaq məharətləri ilə deyil, eləcə də, söz qoşan yaradıcı aşıq-şairlər kimi şöhrət tapmışlar.

Bunu ustad aşıqlarımızın müxtəlif mətbuat orqanlarında, ədəbi məcmuə və toplularda dərc olunmuş əsərləri bir daha əyani şəkildə sübut edir. Həmin əsərlərlə, yəni Borçalı aşıqlarının yaradıcılığı ilə tanış olmaq üçün *"Çeşmə"* (Tbilisi, 1980), *"Dan ulduzu"* (Tbilisi, 1987, 1989, 1990), *"Ağır elli Borçalı"* (Bakı, 1990, Ərzurum 1997), *"Dağlar dərdə düşsə..."* (Marneuli, 1992), *«Aşıq Pəri məclisi-20»* (Bakı, 2004), *«Ədəbi Gürcüstan»* (Tbilisi, 2007), *«Azərbaycan ədəbiyyatı antologiyası - Borçalı»* (Bakı, 2008) ədəbi məcmuələrini, həmçinin, 1991-ci ildə Bakıda işıqüzü görmüş "Aşıq Pəri məclisi. Aşıqlar. El şairləri." Kitabının "Aşıqlar" bölməsini (1991), eləcə də, Musa Nəbioğlunun 2010-cu ildə Bakıda nəfis şəkildə işıqüzü görmüş *"Ozan-Aşıq Dünyası. (Haqqa qovuşan aşıqlarımız)"* foto-albomunu və s. vərəqləmək kifayətdir.

Folklorşunas alim Vaqif Vəliyev yazır: "Müharibədən sonra aşıqlığa başlayan, gözəl və təsirli qoşmaları ilə nəzər-diqqəti cəlb edən aşıqlardan Aşıq Əmrah, Aşıq Hüseyn Saraçlı, Aşıq Kamandar və b. təkcə klassik aşıq sənətini yaşatmaqla kifayətlənmir, eyni zamanda öz zəhmətləri ilə misilsiz qəhrəmanlıqlar göstərən əmək adamlarını tərənnüm edirlər". *(Vəliyev, V. Azərbaycan folkloru. Bakı, 1985, səh. 179)*

Müxtəlif rayonlardan müsabiqə yolu ilə seçilərək 150-dən çox sənətkarın dəvət olunduğu və 1961-ci il aprel ayının 27-də açılmış Azərbaycan aşıqlarının 3-cü tayından söhbət açan professor Paşa Əfəndiyevin *"Azərbaycan şifahi xalq ədəbiyyatı"* kitabında isə oxuyuruq: "Son illərdə aşıq sənətinin məqsədyönlü inkişafı, yeni-yeni istedadların meydana gəlməsi qurultayın səmərəli fəaliyyəti kimi qeyd edilməlidir. Hazırda aşıqlardan Əmrah Gülməmmədovun, Kamandar Əfəndiyevin, Hüseyn Saraçlının və başqalarının adları hörmətlə çəkilir. Onlar bu qədim sənətin ənənələrini yaşadır və inkişaf etdirirlər". *(Bakı, «Maarif», 1981, səh. 360).*

1984-cü il martın 19-da Bakıda açılmış Azərbaycan aşıqlarının 4-cü Qurultayında da Azərbaycanın müxtəlif bölgələrindən, həmçinin Dəmirqapı Dərbənddən və qədim Göyçədən gəlmiş aşıqlarla yanaşı, Borçalıdan gəlmiş saz-söz ustaları da yaxından iştirak etmişlər. Aşıq Kamandar qurultayda məruzə ilə çıxış edərək aşıq sənətinin xəlqiliyindən, onun ideya-estetik mahiyyətindən, Aşıqlar Birliyinin gələcək vəzifələrindən və s. problem məsələlərdən danışmışdır. Qurultayda həmçinin aşıq məclisinin xalq arasında yayılması və sevilməsində Aşıq Əmrahın, Aşıq Hüseyn Saraçlının, Aşıq Kamandarın və başqalarının böyük və misilsiz xidmətlərindən söhbət açılmışdır. *(Vəliyev, V. Azərbaycan folkloru, Bakı, 1985, səh, 231.)*

2002-ci il noyabrın 15-də Gütcüstan azərbaycanlılarının "Yeni yol" Birləşmiş İttifaqının təşəbbüsü ilə Tbilisi şəhərində Gürcüstan azərbaycanlılarının Mədəniyyət, İncəsənət və Aşıqlar Birliyinin təsis konfransı keçirilmişdir. Bunu özünün miqyası və sanbalı etibarı ilə Gürcüstan aşıqlarının II qurultayı da adlandırmaq olar. Çünki ilk dəfə 75 il bundan qabaq Lüksemburq şəhərində (indiki Bolnisi şəhəri) keçirilmiş Borçalı aşıqlarının birinci qurultayından sonra bu, Gütcüstan azərbaycanlıları sənət ustalarının ilk sanballı toplanışı idi. Tədbirdə Gütcüstanın azərbaycanlılar yaşayan bütün bölgələrindən aşıqlar, şairlər, mədəniyyət işçiləri, qonaqlar iştirak edirdilər.

Məclisi giriş sözü ilə Gütcüstan azərbaycanlılarının *"Yeni yol"* Birləşmiş İttifaqının sədri Kamal Muradxanlı açmışdır. O, tarixi tolantının iştirakçılarını, hörmətli qonaqları salamladıqdan sonra bu mühüm hadisənin əhəmiyyətindən danışmış, hər bir xalqın ictimai və mənəvi həyatında musiqinin, şeirin əhəmiyyətini

və rolunu xüsusi vurğulamışdır. Gütcüstanda yaşayan və fəaliyyət göstərən azərbaycanlı aşıqlara xüsusi qayğı ilə yanaşıldığını, onların vaxtaşırı ali dövlət mükafatlarına layiq görüldüklərini faktlarla yada salan natiq onu da xüsusi qeyd etmişdir ki, bügünkü tədbirin də belə yüksək səviyyədə keçirilməsinə şərait və imkan yaradan iki dost ölkənin prezidentləri - Eduard Şevardnadzenin və Heydər Əliyevin apardığı müdrik siyasətə borcluyuq.

Sonra söz Gütcüstan azərbaycanlılarının Mədəniyyət, İncəsənət və Aşıqlar Birliyinin sədri Dərviş Osman Əhmədoğluna verilmişdir. O, hesabat dövrü ərzində Birliyin idarə heyətinin gördüyü işlər və keçirdiyi tədbirlər barədə geniş məruzə etmişdir.

Məruzə ətrafında müzakirələrdə Azərbaycan Respublikasının Gütcüstandakı fövqəladə və səlahiyyətli səfiri Hacan Hacıyev, Türkiyə Cumhuriyyətinin Gütcüstandakı böyük elçisi Fatma Dəclə Kopuz, Gütcüstan mədəniyyət nazirinin müavini Svetlana Ketsba, Bakıdan gəlmiş qonaqlardan - tanınmış folklorşünas alım Elxan Məmmədli və digər qonaqlar, aşıqlar, şairlər, folklor tədqiqatçıları çıxış etmiş, idarə heyətinin gördüyü işlərin zənginliyini və əhəmiyyətini vurğulamışlar. Konfransa göndərilmiş təbrik teleqramları oxunmuşdur.

Tədbir aşıqların, şairlərin, sənət adamlarının ekspromt-çıxışları ilə başa çatmışdır.

2005-ci ildə Bakıdakı *"Şərq-Qərb"* Nəşriyyatı tərəfindən 2 cildlik *"Azərbaycan aşıq şerindən seçmələr"* adlı kitab nəfis şəkildə çap olunaraq oxucuların ixtiyarına verilmişdir. Orta əsr və XIX yüzilliyin tanınmış el sənətkarlarından başlayaraq ta çağdaş dövrümüzün - bu günümüzün uctad aşıqlarına qədər böyük bir dövrü əhatə edən bu kitabda ozanlarımızın seçmə əsərləri, daha doğrusu dövrün, zamanın keşməkeşlərindən keçərək misilsiz poetik irsə çevrilmiş, xalqın mənəvi aləminin, bədii təfəkkürünün, estetik zövqünün zənginləşməsində müstəsna rol oynamış lirik incilər toplanmışdır. Böyük fəxrlə qeyd etməliyik ki, həmin kitabda Aşıq Ələsgər, Aşıq Rəcəb, Aşıq Qurban, Aşıq Mehdi, Padarlı Abdulla, Molla Cuma, Zodlu Usta Abdulla, Çoban Əfqan, Bozalqanlı Aşıq Hüseyn, Aşıq Səməd, Xəyyat Mirzə, Göyçəli Aşıq Musa, Aşıq Şəmşir, Aşıq Hüseyn Cavan də başqaları ilə yanaşı Ulu Borçalımızın Uctad aşıqlarından olan Xındı Məmməd, Aşıq Hüseyn Saraclı, Aşıq Kamandar və başqaları kimi neçə-neçə ustadlarımızın, el aşığının, el şairinin gəraylıları, qoşmaları, təcnisləri, divaniləri, müxəmməsləri, bayatıları daxil edilmişdir.

Bu yerdə sevimli Xalq şairimiz Zəlimxan Yaqubun aşağıdakı sözləri yada düşür: "İlk dəfə qulaqlarım səs eşidən gündən anamın laylasına sazın zümzüməsi qarışıb. Mən, demək olar ki, Aşıq Şenliyin, Aşıq Sadığın, Şair Nəbinin, Şair Ağacanın, Əmrahın, Hüseyn Saraçlının, Aşıq Kamandarın sazı-sözü ilə dünyaya göz açmışam". *(Yaqub, Zəlimxan. Biz bir eşqin butasıyıq. Bakı, "Yazıçı", 1989, səh.5)*

Bu və digər kitabları vərəqlədikcə bir daha görürük ki, doğrudan da, xalq arasından çıxmış, xalqdan öyrənmiş, şifahi ədəbiyyatımızın zəngin irsindən bəhrələnmiş, keçmiş adət və ənənələrə sadiq qalıb, onun yaxşı cəhətlərini yaşadan, el-obanın toy-düyünündə şənlik məclisləri açan mahir saz və söz ustalarından Aşıq Əmrah, Hüseyn Saraçlı, Aşıq Kamandar və b. şifahi və yazılı folklorumuzu yaradan, öz şeir və qoşmaları ilə onu daha da zənginləşdirən sənətkarlardandır.

Biz də bu məqaləmizdə bir daha Borçalı aşıq məktəbini araşdırmış, XX əsr Azərbaycan Aşıq sənətinin ən böyük və ən məşhur nümayəndələrindən olan, görkəmli saz-söz ustadı, Gürcüstan Respublikasının Əməkdar mədəniyyət işçisi Aşıq Hüseyn Saraçlının (1916-1987) zəngin həyat və yaradıcılığını tədqiqta cəlb etmişik.

Tədqiqat

Aşıq Hüseyn Saraçlı 1916-cı ildə qədim Borçalı mahalının Bolulus bölgəsində, indiki Gürcüstanın indiki Bolnisi rayonundakı Saraçlı kəndində tanınmış el ağsaqqalı Qurban ağanın ocağında dünyaya göz açmışdır. O, hələ kiçik yaşlarından saz-söz sənətinə meyl göstərmiş, əvvəlcə Saraçlı Aşıq İsmayılın şagirdi olmuş, sonra isə Borçalının azman sənətkarlarından olan Aşıq Quşçu İbrahimin, Saraçlı şair Hüseynin və Faxralı şair Nəbinin kamilləşmiş, Şair Ağacandan, Qul Allahquludan, Aşıq Bayramdan və Borçalının başqa şair və aşıqlarından mükəmməl dərs almışdır. Elə o vaxtdan da el-el, oymaq-oymaq gəzmiş, Borçalıda, Göyçə mahalında, Dəmirqapı Dərbənddə, Bakıda, Naxçıvanda, Şirvanda, Muğanda, Qarabağda, Azərbaycanın daha bir sıra rayonlarında, Qırğızıstanda, Özbəkistanda, Türkmənistanda ağır məclislər yola salmışdır. Özünün hələ sağlığındaykən dediyi kimi, hər dəfə də məclis əhli ilə üz-üzə gələndə mənən cavanlaşıb. Necə deyərlər, yorğunluğu bir növ rahatlıq olub. Həmişə də 11 telli sazını sinəsinə sıxıb, *«Aşıq el anasıdı, gərək həmişə elin içində olsun»,* - söyləyib. İstedadlı alim-jurnalist bacımız Şərəf xanım Cəlilli demiş, Aşıq Hüseyn on dörd şəyirdi ilə sazı sinəsinə sıxanda qışın qarında-boranında Qaraqayada gül bülbülü, bülbül gülü çağırırdı...

Ustad Aşıq Hüseyn Saraçlının altı övladı, on dörd şəyirdi olmuşdur. Allah ona üç oğul (İsfəndiyar, Abbas, Əli), üç qız (Şəhriyar, Zərnigar, Mehriban) övladı vermişdi. Amma Ustad Aşıq Hüseyn Saraçlı şəyirdlərinin heç birini doğma övladlarından ayırmamışdı. Onlardan Əhməd Sadaxlı, Məhəmməd Sadaxlı, Nürəddin Qasımlı, Sədi Ulaşlı, Aşıq Murad və b. el içində xüsusilə sayılıb seçilmişlər.

Aşıq Hüseyn Saraçlı, sözün əsl mənasında, yaradıcı aşıq-sənətkar idi. O, təkcə gözəl saz çalıb-oxuması və nəğmələr, şeirlər qoşması ilə deyil, həm də yeni saz havaları və dastanlar yaratmaqda, eləcə də həmin havaları ifa etməkdə və dastan danışmaqda da Azərbaycan aşıq sənətində əvəzsiz idi. Aşıq Hüseyn Saraçlı *«Qızıl*

dastan», «Kərəm Burcoğlu» dastanlarını, *«Bağdat dubeyti», «Qürbəti-Kərəm»* və s. saz havalarını yaradıb. *«Koroğlu»* dastanının *«Zərnişan xanımın Çənlibelə gətirilməsi»* və *«Bolu bəy və qoç Koroğlu»* qolları ilk dəfə məhz Aşıq Hüseyn Saraçlı söyləməsində qələmə alınıb.

Görkəmli Xalq şairimiz, tanınmış professor Bəxtiyar Vahabzadə yazır: «Bir neçə dəfə Aşıq Hüseyn Saraçlının söylədiyi dastanları dinləmişəm. Xüsusən Aşıq Ələsgərin Gəncə səfərini ustad aşıq elə bədii və obrazlı danışır ki, vəziyyət teatr tamaşası kimi gözümüzün qarşısında canlanır. Elə bil gözəl bir operaya baxırsan. Bu operanın rejissoru da o özüdür, dirijoru da, ifaçısı da, müşayiət edəni də. Eyni zamanda o, həm libretto müəllifidir, həm də bəstəkar... Məsələnin əsl tərəfi aşığın danışığındakı deyim tərzindəki təbiilik və səmimilik, şirinlik və gözəllikdir. Onun dilindəki «Bizi borana qırdırma», «A çıran keçsin», «Ağzı qırqovullu gəlmisən», «Yel vurub yengələr oynayır», «Ağzımı boza vermə» kimi xalq deyimləri təbii olduğu qədər obrazlı, obrazlı olduğu üçün də dəqiqdir, təsirlidir».

Bu «Gəlimli-gedimli dünya, son ucu ölümlü dünya»-ya qədəm qoyan gündən şifahi xalq ədəbiyyatımızın söz xəzinəsinə öz töhfəsini bəxş edən Aşıq Hüseyn Saraçlı yüzlərlə şeir, qoşma, təcnis, gəraylı, müxəmməs, dodaqdəyməz, qıfılbənd və onlarla dastanın müəllifidir. Onun ilkin tədqiqatçılarından olan Süleyman Əfəndi (Süleyman Süleymanov) sənətkarın 60 illik yubiley təntənələrində ona *«Gürcüstanın Əməkdar mədəniyyət işçisi»* fəxri adı veriləndə, nəinki onun haqqında bədii-sənədli kinofilmə ssenari yazıb Gürcüstan televiziyasının mavi ekranında aşığa şöhrət qazandırmış, həmçinin ustad aşığın hələ sağlığındaykən külliyyatını toplayıb ədəbiyyatşünas-alim, şair Əflatun Saraçlının redaktorluğu ilə *«Yazıçı»* nəşriyyatına təqdim etmişdir. Şeirlərindən nümunələr *«Çeşmə» (1980), «Dan ulduzu» (1987, 1989, 1990), «Ağır elli Borçalı» (Bakı, 1990; Ərzurum, 1996), «Aşıq Pəri məclisi. Aşıqlar. El şairləri» (Bakı, «Yazıçı», 1991)* ədəbi məcmuələrində, «Azərbaycan» jurnalında və bir sıra dövri mətbuat orqanlarında, xüsusilə də *«Cürcüstan»* (əvvəllər *«Sovet Gürcüstanı»*) və *«Bolnisi»* (əvvəllər *«Qələbə bayrağı»*) qəzetlərində işıq üzü görmüş, *«Mən», «Sazım», «Xalqımızın», «Olmaz-olmaz», «Gözəldir»* və s. kimi şeirləri neçə-neçə illərdən bəri dillər əzbəri olan ustad sənətkarımız Aşıq Hüseyn Saraçlının ilk kitabı - *«Şeirlər, söyləmələr»* nəhayət ki, yalnız ölümündən beş il sonra, 1992-ci ildə Bakıda *«Yazıçı»* nəşriyyatı tərəfindən oxucuların ixtiyarına verilmişdir.

Redaktorun «Ön söz»də qeyd etdiyi kimi, bu kitab ustadın yaradıcılığını tam əhatə etməsə də, mərhum sənətkarın sənət xəzinəsindən insanlara yadigar qalmış bir çələngdir. Qocaman el sənətkarının qoşma, gəraylı, divani, müxəmməs və deyişmələriylə yanaşı, onun el-oba məclislərində, şənliklərdə, radio və televiziya verilişlərində söylədiyi qaravəllilərin, maraqlı əhvalatların və folklorumuzun incilərindən sayılan dastanların da daxil edildiyi həmin çələng ustadın *«Addanıram mən»* şeiri ilə açılır:

Əlimə alanda sədəfli sazı,
Elə bil səfərə atdanıram mən.
Gah Koroğlu kimi çəkirəm nərə,
Gah da Kərəm kimi oddanıram mən.

Arzular ürəkdə qol-qanad atır,
Nəğməli sinəmdə yüz dastan yatır.
Elə ki sevənlər muraza çatır,
Sevincə bürünüb şaddanıram mən.

Əzəldən bir şirin dilə vuruldum,
Sazımda səslənən telə vuruldum.
Bu doğma obaya, elə vuruldum,
Hüseyn Saraçlı addanıram mən.

Kitabdan da göründüyü kimi, ustad sənətkar təkcə klassik aşıq poeziyasının ifaçısı deyildi, o, həm də bir çox gözəl, oynaq, axıcı, təsirli qoşmalar, gəraylılar, müxəmməslər müəllifi idi. O, bu Zirvəyə heç də asanlıqla nail olmadığını, bu Zirvəyə qalxan yolların, xüsusilə də sənət və zəhmət yollarının çətin, mürəkkəb və müxtəlifliyini öz şeirlərində dönə-dönə vurğulayır:

Aman lələ, tanıyıram yolları,
Bu yol mənə ərən yolu, ər yolu.
Biri xeyrə, biri şərə çağırar,
Allah yolu, iblis yolu, şər yolu.

Nəyə lazım sandıq dolu xəzinə?

Qızıl üstə qızıl ilan gəzinə.
Mən düşmüşəm həqiqətin izinə,
Gərək deyil sərvət yolu, zər yolu.

Hər bir kəsin əməli var, işi var,
İştahı var, tamahı var, dişi var,
Aşiqlərə meydan verən kişi var,
O göstərər bəndəsinə hər yolu.

Saraçlıyam, yaralarım bitişər,
Can bağında şux bülbüllər ötüşər.
Bir gün gedib Yaradana yetişər,
Sənət yolu, zəhmət yolu, tər yolu.

Aşıq Hüseyn Saraçlı daha sonra isə özünü oxucuya belə təqdim edir:

Məni ulu dərgahına çağıranda ol Xuda,
Dedi, gərək qonağını dilləndirə, oxuda,
Ağam gəldi, mətləb aldım, mətləb verdim yuxuda,
Məhəbbətin dəftəriyəm, sevginin kitabıyam.

Doğma elim Borçalıdı, Saraçlı kəndim mənim,
İtməz huşum, çaşmaz ağlım, pozulmaz zəndim mənim,
Telli sazdı uçmaz qalam, dağılmaz bəndim mənim,
Özüm ulu, yaşım qədim, min ilin hesabıyam.

Bu, eləcə də *«Dünyada», «Görmüşəm», «Gərək», «Sayır»* və s. şeirləri Aşıq Hüseyn Saraçlının sözün əsil mənasında layiqli sənətkar - saz-söz ustası olmasını sübut edir. Şair-aşığın xalq ruhlu bu qoşmalarında, gəraylılarında, müxəmməslərində saza, sözə hörmət, el-obaya, insanlara məhəbbət, yurd sevgisi, vətənpərvərlik və dostluq duyğuları həvəslə tərənnüm olunur.

Aşıq Hüseyn Saraçlı doğma Borçalımızın dünənini və bu gününü, sevincini və kədərini, acrı və acılarını, burada yaşayan yurddaşlarımızın, vətənpərvər və qonaqpərvər soydaşlarımızın tarixi qəhrəmanlıqlarını böyük bir poetik ustalıqla qələmə alır, sanki bir rəsam fırçası ilə Borçalımızın əsrarəngiz gözəlliklərinin rəsmini çəkir:

Qan-qan deməz, can-can deyər, dosta verər canını,
Dodağımda çiçək açıb, dilimdədi Borçalı.
Min illərdi ürəyimdə yaşadıram saz kimi,
Barmağımda, mizrabımda, telimdədi Borçalı.

Tarix yazan mürəkkəbdi, dastan yazan qələmdi,
Sevinci az, kədəri çox, daşıdığı ələmdi,
Bu yollarda mən Kərəməm, o da mənim Lələmdi,
Ocağımda, atəşimdə, külümdədi Borçalı.

Gör nə qədər odu sönmüş odumdan od apardı,
Dəyişdirdi adımızı, adımdan ad apardı,
Mən səpdim, mən becərdim, mən biçdim, yad apardı,
Başı üstə zalımlar var, zülümdədi Borçalı.

Ağrılarda, azarlarda canı sökülüb gedir,
Zamanından tez qocalır, qəddi bükülüb gedir,
Ovcumuzda tutammırıq, qumtək tökülüb gedir,
Ürək edib deyəmmirəm, əlimdədi Borçalı.

Quranın ayəsi kimi müqəddəsdi, müqəddəs,
Hər gün Borçalı deyir içərimdən gələn səs,
Aşıq Hüseyn Saraçlıya həmi candı, həm nəfəs,

Dua kimi axşam-səhər, dilimdədi Borçalı.

Klassik aşıq poeziyasında olduğu kimi, aşıq Hüseyn Saraçlıda da sevgi, məhəbbət motivləri güclüdür. Məhəbbətsiz həyatın boş və mənasız olduğunu başa düşən sənətkar həmişə öz dinləyicilərini sevgi, məhəbbət yolunda hər cür əzab-əziyyətə qatlaşmağa çağırardı. Onun «Gəlmədin» müxəmməsində, eləcə də *«Yenə», «Gələrəm», «Gəlmədin»* və s. kimi qoşmalarında daim insanı ucaldan məhəbbət duyğuları aydın görünür.

Məhəbbət dərdinə dərman diləsə,
Məcnun tək dağları gəzərəm yenə -

- deyən ustad sənətkar oda düşüb atəşlərdə yansa belə, bu haqq yolundan əl çəkməyəcəyini söyləyirdi. O, məhəbbətə, gözəlliyə Məcnun tək vurulduğunu *«Gələrəm»* rədifli qoşmasında belə bildirirdi:

...Doymamışam məhəbbətdən, gözəldən,
Gözəlliyin aşiqiyəm əzəldən.
Payız vaxtı üşüyəndə xəzəldən,
İsinməyə ocağına gələrəm.

Saraçlıyam, talasan da canımı,
Atəşlərə qalasan da canımı,
Cəllad olub sən alsan da canımı,
Cənnət deyib qucağına gələrəm.

Ustad aşığın *«Görmüşəm»* şeirində isə oxuyuruq:

Yoxdur əzəlindən ömrün vəfası,
Çox boşalıb, çox da dolan görmüşəm.
Əlvan bənövşəli, laləli, çöllü,
Xəzəl olub birdən solan görmüşəm.

Aşıq Hüseyn Saraçlının *«Olmaz-olmaz»* sərlövhəli şeiri neçə illərdir ki, Borçalı gənclərinin təlim-tərbiyyəsinə əhəmiyyətli dərəcədə böyük təsir göstərir:

Halal tut mayanı həmişə, oğul,
Haramlıqla dövlət-mal ola bilməz.
Əyri gözlə baxsan özgə şanına,
Boş qalar pətəyin, bal olmaz-olmaz.

Mərifətlə giriş tutduğun işə,
Söz gərək ağızdan çıxmamış bişə.
Bağında gül-çiçək bitər həmişə,
Tikan yarpağından gül olmaz-olmaz.

İbrət götür Saraçlının sözündən,
Müxənnətlər düşər elin gözündən.
Pəhləvan olsan da, demə özündən,
Hər güləşən Rüstəm-Zal olmaz-olmaz.

Sevimli Xalq şairimiz, tanınmış ictimai xadim, Azərbaycan Aşıqlar Birliyinin sabiq sədri mərhum Zəlimxan Yaqub ölməz sənətkarı *«Ulu ozan»* adlandırmış, *«Həyatıma xoş gəldin, Ozanlar ozanı! Dədələr sirdaşı, lələlər yoldaşı, igidlər qardaşı!»* - söyləmiş, onun haqqında *«Hüseyn Saraçlı dastanı» (Bakı, «Pedaqogika», 2007)* adlı olduqca sanballı və dəyərli bir kitab yazmış və nəfis şəkildə nəşr etdirmişdir. Həmin kitabda oxuyuruq:

«Qadir Allah elə bil ki, Aşıq Hüseyn Saraçlını bu dünyaya hazır aşıq libasında gətirmişdi. Uca boyu, düz qəddi, incə beli, enli kürəyi, şəvə, qara eşmə bığları, səliqəli, gümüşü saçları, çopura çalan qara sifəti, açıq alnı, qonur gözləri, incə yerişi, ağayana duruşu, turşməzə, baldan şirin danışığı, buxara papağı, salama, gümüş kəməri, par-par parıldayan qara, xrom çəkməsi, Trabzon tütünündən dolu tənbəki qutusu - hamısı bir yerdə ona xüsusi yaraşıq və gözəllik verirdi. Özü demişkən, ilahinin əlinin boş, meylinin xoş vaxtına düşüb kişilərin

gözəli kimi onu qüdrət qələminnən çəkmişdi. Allahın əziz bəndəsiydi. Tanrı onu xoş gündə, xoş saatda dünyaya gətirmişdi... Ona görə də ozanların, ustadların getdiyi yolun yolçusuna çevriləndə Allaha doğru əl açdı, sözünü dedi. Allah da ondan bir sənətkar kimi heç nəyi əsirgəmədi.»

Tanınmış tədqiqatçı Kərəm Nəbiyevin *«Borçalı»* jurnalının 1994-cü il birinci sayında dərc etdirdiyi *«Onun haqqında az-çox bildiklərimdən»* sərlövhəli məqaləsində qeyd etdiyi kimi, Hüseyn Saraçlı sənətində bir sufilik yönümü də var. Axı, hələ XIII əsrdə yaşamış sufi şair Mövlanə Cələləddin Rumi, onun yolçularından Yunis İmrə, Nəsimi insanların ruhunu, əməlini hər cür çətinliklərdən təmizləməyin və onların haqqa, ilahiyə yaxınlaşmasının bir yolunu da musiqidə və onun tərənələri altında qəzəl və qəsidələrin oxunmasında görürdü. Təsadüfi deyildir ki, XVI-XVIII yüzillərdə sufilərin mövləviyyə qolundan faydalanan bir çox sənətkar aşıqlar incidilsələr də, sufi aşıq kimi tanınmış, böyük ad-san qazanmışdılar. Aşıq Hüseyn Saraçlı da məhz belə yolun yolçularından idi. O, *«Dünyada»* qoşmasında deyir:

Yemək dostu bil ki, nanı itirər,
Şöhrət dostu başa qaxınc gətirər.
Ürək dostu mətləbini bitirər,
Dar günündə verər canı dünyada.

Aşıq Hüseyn Saraçlı ömrü boyu sağlam ünsiyyətli, dəyanətli, etibarlı dost harayında idi. O, hər yetənə dost deməzdi. Dostluğu çox müqəddəs saydığından dostu seçərkən, onu taparkən insanları ağıllı və tədbirli olmağa çağırırdı:

Ürək dostu tək-tək olar dünyada,
Yaxşı dostu seçən hanı dünyada.
Yaxşı dostun ürəyimdə yeri var,
Bekar dostun nə çox sanı dünyada.

Yazıçı Əzim İsmayıllı yazır: «...Dostluq və yoldaşlıqda sədaqətli, sənətdə isə təvazökar olan Aşıq Hüseyn Saraçlı heç vaxt, heç kəslə kin saxlamaz, həmişə qarşısındakı adama və ya sənətkara üstünlük verməyə çalışardı. Şahidi olduğum bir hadisəni xatırlamaq yerinə düşərdi. «Çeşmə» ədəbi məcmuəsinin «El sənətkarları» bölməsində Aşıq Hüseyn Saraçlı birinci, Aşıq Əmrah Gülməmmədov isə ikinci verilmişdir. Aşıq Hüseyn təkid etdi ki, gərək Aşıq Əmrah birinci veriləydi, mən ikinci. Ustad Əmrah cavab verdi ki, əgər saz-söz olsaydı, əlbəttə, mən öndə getməliydim. İndi ki, söhbət söz-sazdan gedir, sənin sözünə-kəlamına kim nə deyə bilər? Bax, beləcə Borçalının iki sənət dühası bir-birinin könlünü alıb, mənim də xətrimə dəymədilər. Aşığın hazırcavablığına, sözü yerində sərrast deməsinə, ən qarışıqlı məclisi bir kəlmə ilə ələ almasına, yalnız Borçalının deyil, Azərbaycan və dünya aşıq sənəti bilicilərinin söz xəzinəsini sinədəftər etməsinə kimin şübhəsi ola bilərdi...»

Bütün ilhamını xalqdan alan, el-obanın adət-ənənəsi ruhuna qonan mərhum sənətkar Aşıq Hüseyn Saraclı adamın gözündə bir folklorçu aşıq kimi də canlanır. Onun yazdığı gəraylıların *(«Qocalığım», «Dədə Şəmkir», «Bulaq», «Elə gedər» və s.)* ruhunda xalq yaradıcılığı gözəl duyulur. Sadə və oynaq dildə yazdığı *«Dağlarda»* adlı gəraylısında xalqın dağ-aran köçü, yaylaq ovqatı, el məclisləri çox gözəl göstərilib:

Köç eyləyər yenə aran,
Haray qopar bu dağlarda.
Neçə məclis, neçə külfət
Çadırlanar bu dağlarda.

Kəkliklər ötər yazınan,
Bülbül ötər avazınan,
Saraçlı da öz sazıynan
Qanadlanar bu dağlarda.

Ustad sənətkarın kitabında özünə yer tapmış divanilərdən *«Çəkər»* xüsusilə maraqlıdır:

Adam var ki, insan kimi
Yaşamağa can çəkər,
Əyri yoldan üzü dönməz,
Doğru yolda qan çəkər.

Adam var ki, heç açılmaz
Başı dava-şavadan.
Desələr ki, nanəcibsən,
And üçün Quran çəkər...

Hüseyn Saraçlının yaradıcılığında aşıq poeziyasının çox maraqlı və geniş yayılmış qollarından olan deyişmə də diqqəti cəlb edir. Onun Aşıq Şəmşirlə, türk aşığı, ladiqarstanlı İslamla, istanbullu Qul Mehdi ilə, həmyerliləri Əflatun Saraçlı və Nizami Saraçlı ilə, kəlbəcərli Dəmirçi Abbasla deyişmələri aşığın bir ustad kimi bacarığını, istedadını, dünyagörüşünü və biliyini tamam-kamal aşkar edir.

Əvvəlcə Aşıq Hüseyn Saraçlının Aşıq Şəmkirlə deyişməsinə diqqət yetirək:

Aşıq Hüseyn Saraçlı:
Havalandı dəli könlüm,
Kəlbəcərdə, Dədə Şəmşir!
Qocalırsan, necə dözüm,
Belə dərdə, Dədə Şəmşir!

Aşıq Şəmşir:
Yeriniz var göz üstündə,
Kəlbəcərdə, ay Saraçlı!
Arxamızda zirvələr var,
Düşmə dərdə, ay Saraçlı!

Aşıq Hüseyn Saraçlı:
İnsanlıqda mehirlisən,
Aşıqlıqda sehirlisən,
Səməd Vurğun möhürlüsən,
Huşda, sərdə, Dədə Şəmşir!

Aşıq Şəmşir:
Şər işlərdə izimiz yox,
Yerə düşən sözümüz yox,
Sənətkarıq, gözümüz yox,
Pulda, zərdə, ay Saraçlı!

Aşıq Hüseyn Saraçlı:
Bu dünyada möhlət azdı,
Xudam özü belə yazdı,
Umudumuz telli sazdı,
Belə yerdə, Dədə Şəmşir!

Aşıq Şəmşir:
Eşqi qəlbimin təpəri,
Borçalıdan ver xəbəri,
Qoy ucalsın «Süsənbəri»,
Pərdə-pərdə, ay Saraçlı!

Aşıq \Hüseyn Saraçlı:
Borçalı bir ağır eldi,
Saz qanımda daşan seldi,
Oylaqları Çənlibeldi,
Mərddi mərdə, Dədə Şəmşir!

Aşıq Hüseyn Saraçlı deyişmələrində qıfılbənd, bağlama, ustadnamə, dodaqdəyməz, hərbəzorba kimi çeşidli şeir növlərini ustalıqla işləmiş və deyişmə zamanı üstünlüyünü heç vaxt əldən verməmişdir. Həmin deyişmələrdən başqa birinə nəzər yetirək.

Aşıq İslamın:
Cəbrin zindanında zira dəst olan,
Çarxın çəpərindən keçməyən bilməz.
Yetən olmaz od mövlanın sirrinə,
Fanidən baqiyə keçməyən bilməz.

-sözlərinə görün Aşıq Hüseyn Saraçlı necə cavab verib:

Kim deyər şirindi, kim deyər acı,
Eşqin badəsini içməyən bilməz.
Kim deyər asandı, kim deyər çətin,
Ustad kürəsində bişməyən bilməz.

Ustad Aşıq Hüseyn Saraçlının doğma eloğlusu, tanınmış şair Nizami Saraçlı ilə 1985-ci ildə qələmə alınmış deyişməsi də olduqca maraqlıdır:

Şair Nizami Saraçlı:
Yetmişində qırğı kimi ötən dost,
Fikir vermə bu dünyada yaşa sən.
Bel bükülməz, diz titrəməz, əl əsməz,
Bundan belə yetmiş il də yaşasan.

Aşıq Hüseyn Saraçlı:
Bağban gülər bağçasıyla, bağıyla,
Borclu olma ömürə sən, yaşa sən.
Zülmü boğdum çarığımın bağıyla,
Dərdim yoxdur yetmiş il də yaşasam.

Şair Nizami Saraçlı:
Ötən günə çox deyibsən qar, a qar,
Dağ başında mehman olub qara qar.
Baxtımıza qoy yağmasın qara qar,
\Bu sinində dözəmməzsən yaşa sən.

Aşıq Hüseyn Saraçlı:
Mən itirdim tər yanağı, tər gülü,
Qoy sulasın yanağın da tər, gülü.
Üzdə solar, içdə açar tər gülü,
Bənzəyirik quruya mən, yaşa sən.

Şair Nizami Saraçlı:
Sən itirdin, mən də tapdım, yarıyıq…
İkimiz də Saraçlının yarıyıq.
Nəyin vardı yarı payla, yarı yığ,
Eh, məni də qocaldacaq yaş asan…

Aşıq Hüseyn Saraçlı:
Saraçlıyam, könlün mənə imrəndi,
İmrən bala, imrən quzum, imrən di.
Məndə bu saz, səndə qələm imrandil,
Mən qocaldım, bunnan belə yaşa sən.

Bəli, «Ustad kürəsi»ndə bişmiş Aşıq Hüseyn Saraçlının kitabında özünə yer tapmış dörd qaravəlli də *(«Keçəlnən kosa», «Dəvə, tülkü, bir də keçi», «Təhnə də qalaylanarmı?»* və *«Fil sağaltmaq»),* deyişmələri kimi, bir-birindən maraqlı, gülməli və düşündürücüdür.

Kitabı vərəqlədikcə bir daha aydın olur ki, yuxarıda artıq qeyd etdiyimiz kimi, Hüseyn Saraçlı aşıq yaradıcılığında geniş yayılmış dastan janrına da həmişə böyük maraq göstərmişdir. O, yaxşı bilirdi ki, toy nişan məclislərində, ağır el yığnaqlarında xalqın bədii zövqünü oxşamaq, onun tarixi qəhrəmanlarından, ulu keçmişindən söhbət açmaq üçün dastan söyləmək daha uğurlu yoldur. Buna görə də, Hüseyn Saraçlı qədimdən bəri olan qəhrəmanlıq və məhəbbət dastanlarımızı - *«Əsli və Kərəm», «Koroğlu», «Yusif və Züleyxa», «Qaçaq Nəbi»* və s.-ni dərindən mənimsəmiş, onların mahir ifaçısına çevrilmişdi.

Tədqiqatçı Kərəm Nəbiyevin məqaləsində çox doğru olaraq qeyd edildiyi kimi, dastan danışmaqda, məclis aparmaqda Aşıq Hüseyn Saraçlı bənzərsiz sənətkar idi. O, elə güclü sənətkar idi ki, bildiyi dastanları heç vaxt olduğu kimi danışmazdı. Həmişə dastanın dilini şirinləşdirməyə çalışar, hətta yeri gələndə bəzən ona gözəl əlavələr də edərdi. Biz onun «Əsli-Kərəm» dastanına dəfələrlə qulaq asmışıq. O, dastanda Kərəm yanğısından danışarkən əlavə edərdi ki: Deməzsənmi bir gün Kərəmə deyirlər, sən haqq aşığısan, elə oxu ki, göydə gedən durna sənin ahından dayansın və qanadından bir lələk salsın. Kərəm götürüb elə qəmli və yanıqlı hava oxuyur ki, o saat durna dayanır və onun qanadından bir lələk düşür.

Aşıq Hüseyn Saraçlı *«Koroğlu», «Qaçaq Nəbi»* və başqa dastanları danışanda da uyarlı əlavələr edərdi. Bax, Aşıq Hüseyn Saraçlı belə yaradıcı sənətkar idi. O, nəinki özünəqədərki dastanların mahir ifaçısı idi, həm də dastan yazan sənətkar idi. Bunu ustadın kitabında özünə yer tapmış dastan və əhvalatlar da *(«Zərnişan xanımın Çənlibelə gətirilməsi», «Gürcü qızınnan Qaçaq Kərəm», «Aşıq Şenniyin Borçalı səfəri», «Mehdi bəyin dastanı», «Cahangirnən Mələksima dastanı», «Şair Ağacanın Ərzurum səfəri», «Aşıq Ələsgərin səfəri», «Aşıq Ələhvərnən şəyirdi Aşıq Qara əhvalatı»)* sübut edir. Onu da əlavə edək ki, Aşıq Hüseyn Bozalqanlı demişkən, dastan danışmaq, məclis aparmaq Aşıq Hüseyn Saraçlı boyuna biçilmişdi...

...1985-ci ilin yaz günlərinin birində Bağdaddan Aşıq Hüseyn Saraçlıya xurma göndərirlər. Xurmanın içindən iki qulac uzunluğunda qadın saçı çıxır. Aşıq Hüseyn Saraçlı xurmanı götürüb sevimli eloğlusu, Borçalının istedadlı şairi Nizami Saraçlının yanına gətirir. Zaman-zaman Təbriz həsrətində qovrulan Nizami Saraçlının qəlbini od götürür. Dərdini, hicranını Araz, Güney niskilinə qatıb, üzünü Aşıq Hüseyn Saraçlıya tutur, *«Bağdaddan gələn sovqat» (Dedim, dedi)* sərlövhəli şeirini söyləyir. Sonralar *«Qələbə bayrağı»* (15.10.1985) qəzetində çap olunmuş həmin şeirdə oxuyuruq:

Dedim: Aç boxçanı ay ustad görək,
Nə sovqat göndərib o Bağdad qızı?
Dedi: Öz saçını büküb xurmaya
Bir damət göndərib o Bağdad qızı!

Dedim: Ölçdüm saçı, iki qulacdı,
Dedi: On iki min dərdə əlacdı.
Dedim: Hüseyn əmi, bu necə saçdı, -
Bir sərvət göndərib o Bağdad qızı!

Dedi: Öz sazımın itmiş simiydi,
Gəzirdim mən onu neçə iliydi.
Oğul, Hüseyn əmin ölha-ölüydü,
Bir möhlət göndərib o Bağdad qızı!

Dedim: Keçəmməzsən hayıf izindən,
Dedi: Qoy bir öpüm saçın üzündən.
Dedi: Sevir səni, öz sevgisindən,
Əlamət göndərib o Bağdad qızı!

Dedi: Yadımdadı o şux qəzəllər,
Dədə Füzulidən oxuyan dillər.
Mənim zinətsizdi sazım əzəllər,
Bir zinət göndərib o Bağdad qızı!

Dedim: Heç unutmaz el əməyini,
Dedi: Oğul bala, yaz diləyimi.
Dedim: Saç adıyla öz ürəyini,
Əmanət göndərib o Bağdad qızı!

Nizami Saraçlı *«Yalan ola ayrılıq...»* poemasını da ustad Aşıq Hüseyn Saraçlıya ithaf etmiş və *«Gürcüstan»* qəzetinin 16 aprel 1988-ci il tarixli nömrəsində dərc etdirmişdir.

Gürcüstanın «Şərəf» ordenli Əməkdar jurnalisti, Borçalının el ağsaqqalı, tanınmış şair-tərcüməçi Dünyamalı Kərəm isə Ustad Aşıq Hüseyn Saraçlının xatirəsinə həsr etdiyi *«Yaz vədəsində»* sərlövhəli şeirini belə başlayır:

Ozanlar ozanı, məclislər şahı,
Susmaq yaraşarmı yaz vədəsində?
Ağır yığnaqların, a söz sərrafı,
Qədrini bilmədik biz vədəsində.

Ağır elli, qədim saz-söz diyarı Borçalı mahalının məşhur sənətkarı Aşıq Əmrah Gülməmmədovun vəfatından düz 40 gün sonra, Gürcüstan Respublikasının Əməkdar mədəniyyət işçisi Aşıq Hüseyn Saraçlı 1987-ci il aprelin 19-da ömrünün 71-ci baharında dünyasını dəyişdi. Beş övladı, 24 nəvəsi, 9 nəticəsi qaldı. Saz-söz dünyamız bir ustad aşığını da itrdi...

Elə həmin gün Ustad aşığın Vida mərasimində sevimli şairimiz Zəlimxan Yaqub bu sətirləri söylədi:

İstər alış, istər tutuş, istər yan,
Torpaq altda cahan canlar apardı.
Çox oğullar köç elədi dünyadan,
Sinəsində çox dastanlar apardı.

Köç günüdü, ay obalar, ay ellər,
Çox sevdiyi bir havanı çaldırın.
Qoy boşalsın dolu gözlər, könüllər,
Onu yerdən «Mansırı»yla qaldırın.

Xəbər verin səs yetişsin hər yana,
Bizi Ləlvər, Lök, Ağlağan dinləsin.
Saraçlını tapşırırıq torpağa,
Qoca dağlar qəmli dastan dinləsin.

Saraçlını tapşırırıq torpağa,
Dərə, ağla, təpə, ağla, düz, ağla.
Qaynar bulaq, dostun köçür dünyadan,
Göz yaşını daşdan-daşa süz, ağla.

Ozan baba, dünya qalan, sən gedən,
Ayrılırıq «Ruhani»dən, «Cəngi»dən,
Yası görüb öz toyunu ləngidən,
Gəlin, ağla, oğul, ağla, qız, ağla.

Bəd xəbərlər biz-biz edər tükümü,
Dağ götürməz dağdan ağır yükümü,
Əcəl yaman baltaladı kökümü,
Könül, ağla, ürək, ağla, göz, ağla.

Teldən ayrı təzənələr nəm çəkər,
Duyan ürək dərd daşıyar, qəm çəkər,
Səndən ötrü min cür nazı kim çəkər?
Pərdə, ağla, sədəf, ağla, saz ağla.

Yüz dəfə çək, yersiz ahdan nə çıxar,
Qəlbi yasda saxlamaqdan nə çıxar,
Ay Zəlimxan, ağlamaqdan nə çıxar?
Az sızılda, az inildə, az ağla,
Saraçlının taleyindən əsər yaz,

Saraçlının dastanını yaz, ağla!

Elə həmin gün ustad aşığın sevimli həmyerlisi, 3 dəfə Beynəlxalq poeziya müsabiqələrinin mükafatçısı, *«Şərəf»* ordenli, tanınmış şair Nizami Saraçlı *«Dünya»* şeirini yazdı və ölməz sənətkarın Vida mərasimində oxudu:

Saraçlı köç edir, mən ağlayıram,
Tale sırğa verib bir ona, Dünya!
Eşilib-burulub qara bığları,
O yenə dağ çəkir yamana, Dünya!

Aşıq eldən gedir, elin yasıdır,
Əyninə geydiyi toy libasıdır.
Çalın, ürəyimi onun sazıdır,
Bülbülə nə gərək virana, Dünya!

Tifaqım dağılıb, o yol üstədir,
Barmaq təzanədə, ürək səsdədir.
Ay ellər, eloğlum son nəfəsdədir,
Bürünüb çisginə-dumana Dünya!

Bu da qismətimə düşən yazıymış,
Xındıdan aldığım yara azıymış…
Yoxsa ki, yurduma Tanrı asıyımış,
Qəddim dönəsiymiş kamana, Dünya!

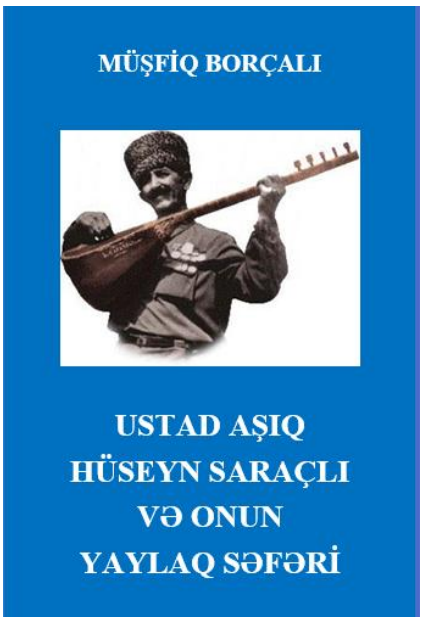
Təpəmdən çıxartdı Əmrah tüstümü,
Hüseynə çəkdiyim bu ah, tüstümü?!
Bu gün odumu gör, sabah tüstümü,
Qoy yansın atəşə pərvana Dünya!

O kimdir təklənən ər meydanında?-
Məni yalqız qoydu Şir meydanında.
Qorxuram dəfn edə balabanında,
Bu ulu sənəti zamana, Dünya!

O gedir sazını tapşırıb bizə,
Gedir həsrət gedir Hoya, Təbrizə.
Bu gediş dağ çəkir ürəyimizə,
Gəlməyir bir dinə-imana Dünya!

Boylanıb sahibsiz saza ağlaram,
Bürünüb bu vaxtsız yasa ağlaram.
Hərdən səsi gələr, ayaq saxlaram,
Bir də yolu düşməz bu yana, Dünya!

Nizami Saraçlı, olma bədgüman,
Gələr, bir də gələr su gələn arxdan.
Burada Şair Nəbi, Şenlik, Ağacan…
Dərin lövbər atıb ümmana, Dünya!



Ustad Aşıq Hüseyn Saraçlının şəninə sonralar yüzlərlə şeirlər yazıldı, nəğmələr qoşuldu, dastanlar yarandı… Hamısının da mövzusu, dəst-xətti, üslubu müxtəlif olsa da, ünvanı bir idi. Həmin ünvan isə… Ustad Aşıq Hüseyn Saraçlı idi…

«Gürcüstan» qəzetinin 21 aprel 1987-ci il tarixli nömrəsində dərc olunmuş nekroloq bu cümlə ilə sona yetir: *«Aşıq Hüseyn Saraçlının əziz xatirəsi, sənətkar siması qəlbimizdən silinən deyil!»*

Nəticə

Bəli, Azərbaycan aşıq sənətinin və Borçalı aşıq məktəbinin inkişafında Ustad Aşıq Hüseyn Saraçlının böyük rolu olmuşdur. Elə buna görə də, Ustad Aşıq Hüseyn Saraçlının əziz və ölməz xatirəsi həmişə hörmətlə yad edilir. Onun 75, 80, 85, 90, 95, 100 illik yubileyləri 1991, 1996, 2001, 2006, 2011, 2016-cı illərdə Bakıda və Borçalıda böyük təntənə ilə qeyd edilmişdir.

2011-ci ildə Azərbaycan Respublikası «Təhsil» Mərkəzi Gürcüstan Azərbaycanlılarının Mədəniyyət Mərkəzi ilə birlikdə bu sətirlərin müəllifinin - filoloq-jurnalist Müşfiq Borçalının Ustad aşıq Hüseyn Saraclının 95 illik Yubileyinə həsr olunmuş *«Aşıq Hüseyn Saraçlı və onun yaylaq səfəri»* adlı kitabını *«Borçalı»* nəşriyyatı vasitəsilə nəfis şəkildə oxucuların ixtiyarına vermişdir. (*Kitabın məsləhətçi:* Gürcüstan Azərbaycanlılarının Mədəniyyət Mərkəzi İdarə Heyətinin sədri Fazil Həsənov; *Redaktoru:* Gürcüstan Mədəniyyət, İncəsənət və Aşıqlar Birliyinin sədri Dərviş Osman; *Rəyçilər:* Filologiya elmləri doktoru, professor Mahmud Allahmanlı və Filologiya elmləri doktoru Şakir Albalıyevdir.) 2016-cı ildə ustadın 100 illik yubileyi ərəfəsində təkrar çap olunmuş həmin kitabda görkəmli saz-söz ustadı Aşıq Hüseyn Saraçlının həyatı və yaradıcılığı haqqında ətraflı məlumat verilmiş, aşığın böyük oğlu İsfəndiyar Həsənovdan əldə edilmiş və indiyə kimi heç yerdə çap olunmamış *«Aşıq Hüseyn Saraçlının Yaylaq səfəri»* adlı dastanı, Azərbaycan Aşıqlar Birliyinin sədri, Xalq şairi Zəlimxan Yaqubun *«Aşıq Hüseyn Saraslı»* və şair Nizami Saraçlının Ustad aşığa həsr etdiyi *«Yalan ola ayrılıq!»* poemaları müəlliflərin dilinə toxunmadan oxuculara təqdim edilmişdir. Unudulmaz sənətkarımızın bir çox dastanları kimi, indiyədək heç yerdə çap olunmamış və oxuculara məhz ilk dəfə təqdim olunan *«Aşıq Hüseyn Saraçlının Yaylaq səfəri»* adlı dastanı da, eləcə də, Ustad aşığın Yubileyinə həsr olunmuş bu kitab bütövlükdə oxucular tərəfindən böyük rəğbətlə qarşılanmış, respublika mətbuatında müsbət rəylər çap olunmuşdur.

Qarşıdan Ustad Aşıq Hüseyn Saraçlının 110 illik Yubileyi gəlir. Biz də bu kiçik yazımızı ölməz və həmişəyaşar sənətkarımızın anadan olmasının 110 illik Yubileyinə ərməğan edir və bir daha *«Allah rəhmət eləsin! Ruhun şad olsun, Ustad!»* - deyirik!...

Bəli, ulu Borçalımız əzəldən igidlər oylağı olduğu kimi, həm də saz-söz diyarı kimi məşhurlaşmışdır. Bu eldə kəhər atlara qamçı dəyəndə səsi o tayda, qədim Bolusun ətəyində dayanarmış. Qılınc şaqqıltısı saz havalarına, sazın səsi sözə, sözün ərməğanı saza, nərə səsinə qarışarmış. Bu diyar ədəbiyyat və incəsənətimizə bəxş elədiyi sənətkar övladları ilə öyünüb həmişə... Və bu ənənə bu gün də davam edir...

Bütün bunlar göstərir ki, bəli, dogrudan da, Borçalı aşıq sənətinin ən başlıca xüsusiyyəti onun milli özünəməxsusluğudur və hörmətli professorumuz Şurəddin Məmmədli demişkən, *"Azərbaycan xalqı ilə saz həmyaş"* olduğu kimi, *"Borçalı ilə də saz ekvivalentdirlər"*.

Və biz bu bənzətməyə daha bir əlavə etmək istəyirik: Bəli, Borçalı dedikdə saz-söz yada düşür, saz-söz dedikdə Borçalı... Nə qədər ki, Borçalı var, bir o qədər də Saz var, Söz var, nə qədər ki, Saz var, Söz var, bir o qədər də Borçalı var. Nə qədər ki, Borçalı var, nə qədər ki, saz-söz var, bir o qədər də Aşıq Hüseyn Saraçlı var və həmişə də var olacaq!...

Ədəbiyyat

1. Aşıq Hüseyn Saraçlı. Şeirlər, söyləmələr. Bakı, "Yazıçı", 1992.
2. Bayramov, Dəyanət. Ustadla üz-üzə. "Bakı Universiteti" qəzeti, 26 oktyabr, 1987.
3. Borçalı, Müşfiq. Ağır elli Borçalı. Bakı, 1990; Ərzurum, 1996. səh. 5, 12, 34.
4. Borçalı (Çobanlı) Müşfiq Mədədoğlu. Çağdaş Borçalı ədəbi məktəbi. «Azərbaycan» nəşriyyatı, Bakı, 1994, 224 səh., səh. 58-65;
5. Borçalı, Müşfiq. Aşıq Hüseyn Saraçlı və onun Yaylaq səfəri. Bakı, "Borçalı", 2011, 2016.
6. Çobanov, Mədəd. «Koroğlun»nun yeni qolu. "Gürcüstan" qəzeti, 10 yanvar, 1978;
7. Həkimov, Mürsəl. Xalqımızın deyimləri və duyumları. B., 1986.
8. Ömərov, İsmayıl,; Borçalı, Müşfiq. Borçalı aşıqları. Bakı, 1996, Təbriz, 1998, Tehran, 2009, səh. 25-32;
9. "Gürcüstan" qəzeti (1960-2015). 21 aprel 1987; 20 aprel, 1991; 25 may, 1991.
10. Vahabzadə, Bəxtiyar. Vətən ocağının istisi. B, "Gənclik", 1982, səh. 75.
11. Yaqub, Zəlimxan. Biz bir eşqin butasıyıq. Bakı, "Yazıçı", 1989, səh.5
12. Yaqub, Zəlimxan. Hüseyn Saraçlı dastanı. Bakı, "Pedaqogika", 2007.

FROM TWO LANGUAGES TO MANY: HOW BILINGUALISM SUPPORTS CHILDREN'S LANGUAGE LEARNING

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Abstract

In today's globalized and multilingual world, many children grow up bilingual and later learn additional foreign languages through schooling. Although bilingualism is often associated with cognitive and linguistic benefits, its role in learning third and fourth languages remains debated. This article examines how bilingualism shapes children's acquisition of additional languages by focusing on cognitive processes, cross-linguistic interaction, and educational contexts. Drawing on research in psycholinguistics and multilingual education, it highlights both advantages—such as increased metalinguistic awareness and learning efficiency—and challenges, including language interference and cognitive overload. Overall, the findings suggest that bilingualism generally supports multilingual learning when appropriate instructional and sociocultural support is provided.

Keywords: bilingual development, multilingual learners, third language learning, fourth language acquisition, language teaching and learning

Introduction

Bilingualism is no longer seen as an unusual or exceptional condition. Due to migration, global communication, and multilingual education policies, many children grow up using two languages in their everyday lives. In many school systems, these children are also expected to learn additional foreign languages, especially in societies where multilingual skills are valued. As a result, managing more than two languages has become a normal part of childhood for many learners.

For many years, language research focused on monolingual students learning a second language, but today's classrooms are much more diverse. Bilingual children bring valuable experience managing multiple languages, which shapes how they learn a third or fourth language. Instead of starting from scratch, they draw on what they already know, developing new strategies based on their existing linguistic knowledge.

Having multiple languages in a child's mind brings both opportunities and questions. While bilingualism can make learning additional languages easier, it can also cause confusion or interference. Schools also need to be prepared to support multilingual learners. This article explores both the benefits and challenges bilingual children encounter when learning extra languages.

Findings and Discussion

One of the strongest arguments in favor of bilingualism is its cognitive benefits. Studies consistently show that bilingual children tend to develop stronger executive functions, such as attention control, problem-solving skills, and mental flexibility (Adesope et al., 2010). These skills emerge because bilinguals constantly manage two language systems and choose the appropriate one depending on the situation. When learning a third or fourth language, these abilities become especially valuable. Tasks such as identifying patterns, focusing for extended periods, and applying new grammatical rules are often easier for bilingual children because they already know how to handle linguistic complexity.

Another important advantage is increased metalinguistic awareness—the ability to think about language as a system rather than simply using it to communicate. Because bilingual children are exposed to different ways of expressing meaning, they are often more aware that languages work differently (Bialystok, 2001). This awareness helps them compare grammatical structures, notice similarities and differences between languages, and understand that rules are not universal. In classroom settings, where explicit language instruction is common, this skill can be particularly helpful.

Bilingual children often learn additional languages more easily than monolinguals because they are already familiar with how language learning works. They use strategies like spotting patterns, using context, and comparing languages. When languages share similarities—such as vocabulary or grammar—this prior knowledge can further speed up learning (Cenoz & Jessner, 2009).

Another strength often seen in bilingual learners is a higher tolerance for ambiguity. Moving between two languages on a daily basis teaches children to cope with uncertainty and mixed signals. As a result, they are often more comfortable encountering unfamiliar words, structures, or usage patterns in a new language.

This flexibility can reduce anxiety and increase motivation—both of which are important factors for successful language learning (Dewaele & Li, 2021).

However, multilingual learning is not without difficulties. While knowledge of one language can support learning another, it can also lead to interference. This happens when elements from one language appear unintentionally in another, affecting pronunciation, grammar, or word order. For instance, sounds or sentence patterns from a child's first or second language may influence how they speak a third or fourth language, especially in the early stages (Jarvis & Pavlenko, 2020). Such interference can also occur at the grammatical level when learners temporarily apply rules from one language to another with a different structure (Herdina & Jessner, 2002).

Importantly, researchers emphasize that these interference effects are a normal part of multilingual development rather than signs of weakness or failure (Jessner, 2008). As children gain more exposure and experience, they gradually learn to separate their languages more clearly. The quality of instruction plays a key role here. Teaching methods that explicitly highlight similarities and differences between languages can help reduce confusion and support deeper understanding.

Another challenge is cognitive overload. Learning several languages at the same time can place heavy demands on children, especially if they do not receive enough exposure or practice in each language. In school systems with limited instructional time, this may result in uneven language development. Strong skills in the first and second languages are therefore crucial, as they provide a stable foundation for further language learning (Cummins, 2000).

The educational context strongly influences how successfully bilingual children learn additional languages. Many language programs are still based on monolingual assumptions and do not fully recognize the rich linguistic knowledge bilingual students bring with them. When instruction treats each language as separate and ignores learners' prior experience, children may not be able to use their strengths effectively. In contrast, programs that acknowledge and integrate students' multilingual backgrounds tend to support more efficient learning and higher motivation.

Sociocultural factors are equally important. Parental attitudes, language policies, and the social status of different languages all affect how motivated and confident children feel. When multilingualism is valued and encouraged, children are more likely to approach language learning positively. Age also matters: younger children often develop pronunciation more easily, while older learners may benefit from stronger literacy skills and cognitive maturity (De Angelis, 2007). Effective teaching therefore needs to be age-appropriate, learner-centered, and flexible.

Teacher preparation is another key factor. Educators need a solid understanding of bilingualism and multilingual development in order to support their students effectively. Without proper training, teachers may rely on methods designed for monolingual learners, which can limit multilingual students' progress. Well-designed teacher education programs should combine theoretical knowledge with practical strategies for managing cross-linguistic influence and adapting instruction to diverse classrooms. When teachers see multilingualism as an asset rather than a problem, they are better able to create inclusive and supportive learning environments.

Conclusion

In conclusion, bilingualism provides a strong foundation for learning third and fourth foreign languages. Cognitive advantages, metalinguistic awareness, and prior language learning experience help bilingual children approach new languages with confidence and flexibility. At the same time, challenges such as interference, cognitive overload, and insufficient instructional support must be carefully addressed. When schools adopt multilingual-aware teaching practices and when sociocultural environments value linguistic diversity, bilingual children are well positioned to succeed. Overall, the evidence shows that bilingualism is a resource rather than a barrier, and with the right support, it can lead to more effective and confident multilingual development.

References

1. Adesope OO, Lavin T, Thompson T, Ungerleider C. A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Rev Educ Res*. 2010;80(2):207–245. doi:10.3102/0034654310368803.

2. Bialystok E. *Bilingualism in development: language, literacy, and cognition*. Cambridge: Cambridge University Press; 2001.

3. Cenoz J. The influence of bilingualism on third language acquisition. *Int J Biling*. 2003;7(1):71–87. doi:10.1177/13670069030070010501.

4. Cenoz J, Jessner U. *Multilingualism and cross-linguistic influence*. Clevedon: Multilingual Matters; 2009.

5. Cummins J. *Language, power and pedagogy: bilingual children in the crossfire*. 2nd ed. Clevedon: Multilingual Matters; 2000.

6. De Angelis G. *Third or additional language acquisition*. Clevedon: Multilingual Matters; 2007.

7. Dewaele JM, Li W. What makes multilinguals more resilient? The effects of multilingual experience on tolerance of ambiguity and empathy. *J Multiling Multicult Dev*. 2021;42(7):608–622. doi:10.1080/01434632.2020.1779860.

8. Herdina P, Jessner U. *A dynamic model of multilingualism: perspectives of change in psycholinguistics*. Clevedon: Multilingual Matters; 2002.

9. Jarvis S, Pavlenko A. *Crosslinguistic influence in language and cognition*. New York: Routledge; 2020.

10. Jessner U. A dynamic perspective on multilingualism and metalinguistic awareness. *Mod Lang J*. 2008;92(2):270–283. doi:10.1111/j.1540-4781.2008.00714.x.

TECHNOLOGIES FOR ASSESSING STUDENTS' COMMUNICATIVE COMPETENCE THROUGH TEXT

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ТЕХНОЛОГИИ ОЦЕНКИ КОММУНИКАТИВНОЙ КОМПЕТЕНЦИИ УЧАЩИХСЯ ЧЕРЕЗ ТЕКСТ

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Abstract

The article examines modern technologies for assessing students' communicative competence through text in Russian as a foreign language. The text-centered approach, types of text-based tasks (receptive, transformational, productive, integrated), evaluation criteria (linguistic, discursive, pragmatic, sociocultural), and the level-based approach (A2–B2) are discussed. Methodological advantages and limitations are identified, and ways to increase assessment objectivity are proposed.

Аннотация

Статья посвящена современным технологиям оценки коммуникативной компетенции учащихся через текст на материале русского языка как иностранного. Рассматриваются текстоцентрический подход, типы текстовых заданий (рецептивные, трансформационные, продуктивные, комплексные), критерии оценки (языковой, дискурсивный, прагматический, социокультурный) и уровневой подход (A2–B2). Выявлены методические преимущества и ограничения, предложены пути повышения объективности оценки.

Keywords: communicative competence, Russian as a foreign language, text-centered approach, assessment, text-based tasks.

Ключевые слова: коммуникативная компетенция, русский язык как иностранный, текстоцентрический подход, оценка, текстовые задания.

В условиях современного языкового образования, ориентированного на функциональное владение языком, проблема оценки коммуникативной компетенции учащихся приобретает особую актуальность. В методике преподавания русского языка как иностранного (РКИ) коммуникативная компетенция рассматривается как интегративное качество личности, включающее способность эффективно использовать языковые средства в различных ситуациях общения с учётом социокультурного и прагматического контекста.

Одним из наиболее продуктивных инструментов формирования и диагностики коммуникативной компетенции в обучении РКИ является **текст**, выступающий не только объектом анализа, но и средством моделирования речевой деятельности. Текстоцентрический подход позволяет рассматривать язык в его функционировании, а не в виде изолированных единиц, что принципиально важно для объективной оценки коммуникативных умений учащихся.

Цель настоящей статьи — рассмотреть современные технологии оценки коммуникативной компетенции обучающихся через работу с текстом в практике преподавания русского языка как иностранного, а также выявить их дидактический потенциал и ограничения.

Понятие коммуникативной компетенции вошло в научный оборот благодаря работам Д. Хаймса, который противопоставил его узкому пониманию языковой компетенции как знания грамматических правил. В дальнейшем концепция получила развитие в трудах М. Канале и М. Суэйн, выделивших грамматическую, социолингвистическую, дискурсивную и стратегическую составляющие коммуникативной компетенции [Canale, Swain, 1980].

В отечественной лингводидактике коммуникативная компетенция трактуется как «способность личности использовать язык в соответствии с целями и условиями общения, нормами речевого поведения и культурными ожиданиями социума» [Азимов, Щукин, 2009, с. 132]. Для методики РКИ принципиально важно, что коммуникативная компетенция формируется и проявляется **в тексте и через текст**, поскольку именно текст является основной формой реализации речевой деятельности.

Оценка коммуникативной компетенции, таким образом, не может сводиться исключительно к проверке лексико-грамматических знаний. Она должна включать анализ умений:

- понимать текст в его смысловой и прагматической целостности;
- интерпретировать коммуникативное намерение автора;
- порождать собственные тексты, адекватные заданной ситуации общения;
- использовать языковые средства с учётом жанра, адресата и цели высказывания.

В методике преподавания РКИ текст рассматривается как «единица обучения и контроля, отражающая функционирование языка в реальной коммуникации» [Костомаров, Митрофанова, 2012, с. 47]. Использование текста в оценочной деятельности позволяет перейти от формального контроля к функционально-коммуникативному анализу речевых умений обучающихся.

С точки зрения оценки коммуникативной компетенции текст выполняет несколько ключевых функций:

1. **Диагностическую** — выявление уровня владения языком в рецептивных и продуктивных видах речевой деятельности.
2. **Интегративную** — одновременная проверка лексических, грамматических, дискурсивных и прагматических навыков.
3. **Моделирующую** — воспроизведение типичных коммуникативных ситуаций.

Особое значение в РКИ имеют аутентичные и условно-аутентичные тексты, поскольку они отражают реальные речевые практики и социокультурные нормы. Работа с такими текстами позволяет оценить не только языковую корректность, но и коммуникативную уместность высказывания.

Текстоцентрический подход в обучении и оценке РКИ основывается на признании текста центральной единицей коммуникации и обучения. Как отмечает Е. И. Пассов, «коммуникативность обучения возможна лишь тогда, когда объектом и результатом обучения становится текст в широком смысле этого слова» [Пассов, 2000, с. 89].

В рамках данного подхода получили распространение следующие технологии оценки коммуникативной компетенции через текст:

- анализ понимания текста (вопросы открытого типа, интерпретационные задания);
- трансформационные задания (пересказ, аннотирование, реферирование);
- продуктивные задания (написание собственного текста по коммуникативному заданию);
- дискурсивный анализ (оценка связности, логики, жанровой адекватности текста).

Эти технологии позволяют оценивать не отдельные языковые элементы, а способность учащегося действовать в рамках целостного коммуникативного акта, что соответствует современным требованиям к контролю результатов обучения РКИ.

Оценка коммуникативной компетенции учащихся в системе РКИ через текст предполагает использование разнообразных типов заданий, направленных на выявление различных аспектов речевой деятельности. В отличие от традиционного тестового контроля, текстовые задания позволяют диагностировать способность обучающегося к смыслопорождению и интерпретации, что соответствует коммуникативной направленности обучения.

С методической точки зрения текстовые задания, применяемые для оценки коммуникативной компетенции, могут быть классифицированы по нескольким основаниям.

К данной группе относятся задания, направленные на проверку умений восприятия и интерпретации письменного текста. Они позволяют оценить уровень сформированности смыслового чтения, а также способность выявлять коммуникативное намерение автора.

Наиболее распространёнными являются:

- задания на определение основной темы и идеи текста;
- выявление логико-смысловых связей между частями текста;
- интерпретация подтекста и оценка позиции автора;
- соотнесение текста с коммуникативной ситуацией.

В методике РКИ подчёркивается, что понимание текста не сводится к извлечению информации, а предполагает «осмысление текста как речевого поступка» [Щукин, 2011, с. 214]. Поэтому оценка рецептивных умений должна учитывать не только точность ответа, но и глубину интерпретации.

Репродуктивные задания занимают промежуточное положение между рецептивной и продуктивной речевой деятельностью. Они ориентированы на переработку исходного текста с сохранением его смысловой основы.

К числу наиболее показательных относятся:

- пересказ текста с учётом заданного коммуникативного параметра (адресат, цель);
- аннотирование и реферирование;
- сокращение или расширение текста;
- изменение жанровой формы текста.

Данные задания позволяют оценить способность учащегося:

- выделять смысловые опоры текста;
- перестраивать текстовую структуру;
- использовать языковые средства в соответствии с новой коммуникативной задачей.

Как отмечает В. Г. Костомаров, «умение трансформировать текст свидетельствует о переходе от пассивного понимания к активному владению языком» [Костомаров, 2005, с. 63].

Продуктивные задания являются ключевым инструментом оценки коммуникативной компетенции, поскольку именно в процессе порождения собственного текста наиболее полно проявляются коммуникативные умения учащегося.

В практике РКИ широко используются следующие виды заданий:

- написание связного текста по заданной коммуникативной ситуации;
- ответ на проблемный вопрос с опорой на исходный текст;
- создание текста определённого жанра (письмо, отзыв, эссе, сообщение);
- продолжение или завершение предложенного текста.

При оценке таких заданий важным является не только соответствие языковым нормам, но и:

- адекватность коммуникативного намерения;
- логичность и связность текста;
- жанровая и стилистическая уместность;
- ориентация на адресата.

Современные методисты подчёркивают, что продуктивный текст в РКИ следует рассматривать как «результат коммуникативного выбора, а не механического применения правил» [Азимов, Щукин, 2009, с. 278].

Особое место в системе оценки коммуникативной компетенции занимают комплексные задания, объединяющие несколько видов речевой деятельности. Они моделируют реальные коммуникативные ситуации и позволяют получить целостное представление о уровне языковой подготовки обучающегося.

Примером комплексного задания может служить:

- чтение текста с последующим письменным откликом;
- анализ текста и формулирование собственной позиции;
- переработка текста с учётом изменения коммуникативной роли говорящего.

Подобные задания соответствуют требованиям общеевропейской системы уровней владения иностранным языком (CEFR), где подчёркивается необходимость оценки способности обучающегося «действовать посредством языка» в конкретных ситуациях общения.

Эффективность технологий оценки коммуникативной компетенции через текст в системе РКИ во многом определяется чёткостью и обоснованностью критериев оценивания. Отсутствие единых параметров оценки приводит к субъективности контроля и затрудняет сопоставимость результатов обучения.

В современной лингводидактике коммуникативная компетенция рассматривается как многоуровневая структура, что предполагает выделение комплекса критериев, отражающих различные стороны речевой деятельности учащегося. При текстоцентрическом подходе данные критерии реализуются через анализ созданного или интерпретированного текста.

Языковой критерий направлен на оценку степени владения системой русского языка и проявляется в корректности использования лексических, грамматических и синтаксических средств.

К основным показателям языкового критерия относятся:

- адекватность выбора лексики коммуникативной задаче;
- грамматическая правильность высказывания;
- соблюдение норм словообразования и управления;
- орфографическая и пунктуационная грамотность (в письменных текстах).

В методике РКИ подчёркивается, что языковые ошибки должны оцениваться с учётом их влияния на понимание текста. Как отмечает А. Н. Щукин, «ошибка становится коммуникативно значимой лишь тогда, когда она препятствует реализации речевого намерения» [Щукин, 2011, с. 301]. Следовательно, при оценке коммуникативной компетенции приоритет отдаётся функциональной стороне языковой правильности.

Дискурсивный критерий отражает способность учащегося строить связный, логически организованный текст в соответствии с нормами русской письменной речи.

Показателями данного критерия являются:

- целостность и связность текста;

- логическая последовательность изложения;
- использование средств текстовой связности (лексических повторов, местоимений, союзов);
- членение текста на смысловые части.

Дискурсивная компетенция проявляется в умении организовать текст как завершённое высказывание. В контексте РКИ это особенно важно, поскольку учащиеся нередко демонстрируют фрагментарное владение языком, не переходя к целостному текстопорождению. По справедливому замечанию Е. И. Пассова, «коммуникация невозможна без дискурса, а дискурс невозможен без текста» [Пассов, 2000, с. 94].

Прагматический критерий связан с оценкой соответствия текста коммуникативной ситуации и речевому намерению говорящего. Он позволяет определить, насколько учащийся осознаёт цель высказывания и способен реализовать её языковыми средствами.

К показателям прагматического критерия относятся:

- соответствие текста заданной коммуникативной задаче;
- ориентация на адресата;
- уместность используемых языковых средств;
- способность выражать оценку, позицию, отношение.

Для методики РКИ прагматический аспект особенно значим, поскольку овладение языком предполагает не только знание форм, но и понимание их функционального назначения. Как подчёркивает В. Г. Костомаров, «владеть языком — значит владеть его употреблением» [Костомаров, 2005, с. 71].

Социокультурный критерий отражает способность учащегося учитывать культурные нормы и ценности русскоязычного коммуникативного пространства. Он проявляется как в понимании исходного текста, так и в создании собственного высказывания.

Основные показатели данного критерия:

- адекватность речевого поведения культурному контексту;
- понимание национально-культурных реалий, отражённых в тексте;
- соблюдение норм речевого этикета;
- корректность использования культурно маркированной лексики.

В методике РКИ подчёркивается, что социокультурная компетенция формируется прежде всего через работу с текстами, отражающими реальные коммуникативные практики. По мнению Е. М. Верещагина и В. Г. Костомарова, «текст является носителем культурной информации и ключом к пониманию иной языковой картины мира» [Верещагин, Костомаров, 1990, с. 38].

Перечисленные критерии не функционируют изолированно. В реальной оценочной практике они образуют целостную систему, позволяющую комплексно оценить уровень коммуникативной компетенции учащегося.

Интегративный подход к оценке предполагает:

- отказ от формального подсчёта ошибок;
- ориентацию на коммуникативный результат;
- соотнесение оценки с уровнем владения языком (A2–C1);
- использование аналитических и дескриптивных шкал.

Таким образом, текст выступает не только средством обучения, но и универсальным инструментом диагностики коммуникативной компетенции в РКИ.

Практическая реализация технологий оценки коммуникативной компетенции через текст в системе РКИ предполагает учёт уровней владения языком, определяемых общеевропейской шкалой (CEFR), а также специфики учебных целей и контингента обучающихся. Текстовые задания в данном контексте выступают не только средством контроля, но и формой моделирования типичных коммуникативных ситуаций.

На уровне A2 основное внимание уделяется проверке способности учащегося понимать и порождать тексты, связанные с повседневной тематикой, в стандартных и предсказуемых ситуациях общения.

Типы текстов:

- короткие информационные тексты (объявления, сообщения);
- адаптированные повествовательные тексты;
- простые описания.

Примеры оценочных заданий:

- определить тему и основную информацию текста;
- ответить на вопросы по содержанию текста;

• составить краткий письменный ответ по образцу;
• пересказать текст с опорой на ключевые слова.

Критерии оценки:

• понимание основного содержания текста;
• элементарная связность высказывания;
• ограниченный, но уместный лексико-грамматический выбор.

На данном уровне коммуникативная компетенция проявляется прежде всего в способности учащегося использовать текст как средство передачи базовой информации. Ошибки оцениваются с точки зрения их влияния на понимание, а не формальной корректности.

Уровень B1 предполагает переход от элементарного понимания текста к его интерпретации и осмысленному порождению собственных высказываний. Тексты усложняются как в содержательном, так и в структурном отношении.

Типы текстов:

• публицистические и учебно-научные тексты;
• тексты с выраженной авторской позицией;
• тексты описательно-рассуждающего характера.

Примеры оценочных заданий:

• выделение основной и второстепенной информации;
• формулирование краткого письменного резюме текста;
• ответ на проблемный вопрос с опорой на текст;
• написание связного текста по заданной коммуникативной ситуации.

Критерии оценки:

• логичность и последовательность изложения;
• адекватность коммуникативного намерения;
• использование средств текстовой связности;
• относительная жанровая корректность.

На данном этапе особенно значимым становится дискурсивный критерий, поскольку учащийся должен продемонстрировать способность организовать текст как целостное коммуникативное высказывание.

На уровне B2 коммуникативная компетенция характеризуется относительной автономностью речевой деятельности, способностью к аргументации и осознанному выбору языковых средств в зависимости от коммуникативной цели.

Типы текстов:

• аутентичные публицистические и научно-популярные тексты;
• тексты с имплицитной оценкой и подтекстом;
• тексты различных функциональных стилей.

Примеры оценочных заданий:

• аналитическое чтение текста с последующим комментарием;
• написание аргументированного эссе;
• интерпретация позиции автора;
• трансформация текста с изменением коммуникативной установки.

Критерии оценки:

• глубина понимания текста;
• аргументированность и структурированность высказывания;
• стилистическая уместность;
• учёт социокультурного контекста.

На данном уровне текстовая деятельность становится основным показателем сформированности коммуникативной компетенции, а оценка приобретает аналитический и дескриптивный характер.

Для повышения объективности оценки коммуникативной компетенции через текст в практике РКИ рекомендуется использование аналитических шкал, включающих описание уровней владения языком по каждому из критериев (языковому, дискурсивному, прагматическому, социокультурному).

Подобные шкалы позволяют:

• минимизировать субъективность оценивания;
• обеспечить сопоставимость результатов;
• соотнести контроль с целями обучения.

В методической литературе подчёркивается, что переход к дескриптивной оценке является необходимым условием реализации коммуникативного подхода в обучении иностранным языкам

[Азимов, Щукин, 2009].

Анализ современных технологий оценки коммуникативной компетенции через текст в РКИ позволяет выделить как преимущества, так и определённые ограничения, имеющие практическое значение для преподавателей и методистов.

Использование текстов в диагностике коммуникативной компетенции предоставляет следующие преимущества:

1. **Целостная оценка речевой деятельности.** Текст позволяет одновременно проверять владение лексикой, грамматикой, связностью и дискурсивной организацией высказывания, что невозможно при традиционных тестах на знание правил.
2. **Моделирование реальных коммуникативных ситуаций.** Комплексные задания, включающие чтение, интерпретацию и порождение текста, отражают реальные языковые потребности учащихся.
3. **Дифференцированный подход к учащимся.** Использование разнообразных типов текстов (аутентичные, адаптированные, проблемные) позволяет учитывать уровень владения языком (от А2 до В2) и индивидуальные особенности обучающихся.
4. **Развитие социокультурной компетенции.** Работа с текстами, содержащими национально-культурные реалии, способствует формированию навыков адекватного языкового поведения и понимания культурного контекста.

Эти преимущества делают текст ключевым инструментом формирования и оценки коммуникативной компетенции в системе РКИ, соответствующим требованиям коммуникативного подхода и современным стандартам обучения иностранным языкам.

Несмотря на очевидные достоинства, применение текстоцентрических технологий оценки сопровождается рядом методических трудностей:

1. **Субъективность оценивания.** Несмотря на использование аналитических шкал и дескрипторов, оценка дискурсивных и прагматических элементов текста может оставаться частично субъективной, особенно на уровнях В1–В2.
2. **Временные затраты.** Создание и проверка текстовых заданий требует больше времени по сравнению с тестами закрытого типа, что затрудняет массовый контроль.
3. **Неравномерная подготовка учащихся.** Различия в предыдущем опыте обучения и уровне владения языком могут влиять на продуктивность выполнения текстовых заданий, что требует дифференцированного подхода и индивидуального контроля.
4. **Ограниченность критериев.** Хотя предложенная система критериев (языковой, дискурсивный, прагматический, социокультурный) обеспечивает комплексность оценки, она не охватывает всех аспектов межкультурной коммуникации и стратегий преодоления коммуникативных трудностей.

Для минимизации этих ограничений рекомендуется:

- комбинировать текстовые задания с другими формами контроля (аудирование, устная речь);
- использовать стандартизированные дескрипторы;
- предусматривать рубрики самооценки и взаимного оценивания учащихся;
- внедрять электронные платформы для автоматизированного анализа текста (лексико-грамматических и дискурсивных показателей).

Перспективным направлением является интеграция текстоцентрической оценки с современными цифровыми инструментами анализа речи и текста. Автоматизированные системы могут позволить:

- оценивать связность текста, логические структуры, стилистическую адекватность;
- предоставлять мгновенную обратную связь;
- формировать индивидуальные траектории развития коммуникативной компетенции.

Также важным представляется развитие межкультурного компонента оценки, включая анализ стратегий преодоления языковых и культурных барьеров через текст.

Анализ современных технологий оценки коммуникативной компетенции через текст в системе русского языка как иностранного показал, что текст является универсальным инструментом как формирования, так и диагностики речевых умений учащихся. Текстоцентрический подход позволяет:

1. Оценивать интегративные проявления коммуникативной компетенции, включая языковую, дискурсивную, прагматическую и социокультурную составляющие.
2. Моделировать реальные коммуникативные ситуации, что способствует повышению функциональной значимости обучения.
3. Дифференцировать контроль в зависимости от уровня владения языком (А2–В2) и индивидуальных особенностей обучающихся.

Практическая реализация текстоцентрической оценки требует использования разнообразных

типов заданий: рецептивных, трансформационных, продуктивных и комплексных. Важным элементом является разработка аналитических шкал и дескрипторов, которые позволяют минимизировать субъективность оценивания и обеспечивают сопоставимость результатов.

Методические ограничения, такие как временные затраты, субъективность оценки дискурсивных элементов и необходимость дифференцированного подхода, могут быть частично преодолены за счёт внедрения электронных платформ анализа текста, рубрик самооценки и взаимного оценивания.

Перспективным направлением является интеграция технологий оценки с цифровыми инструментами анализа речи и текста, что позволит расширить возможности диагностики коммуникативной компетенции и повысить её точность и оперативность.

Таким образом, текст как инструмент оценки в РКИ обеспечивает комплексный, функционально ориентированный контроль, соответствующий современным требованиям коммуникативного подхода и стандартам обучения иностранным языкам.

Список литературы

1. Азимов А. Г., Щукин А. Н. Русский язык как иностранный: теория и практика. — М.: Просвещение, 2009. — 312 с.
2. Верещагин Е. М., Костомаров В. Г. Методика преподавания русского языка как иностранного. — М.: Высшая школа, 1990. — 256 с.
3. Пассов Е. И. Текст и обучение иностранным языкам. — М.: ИИЯ РАН, 2000. — 184 с.
4. Костомаров В. Г., Митрофанова Т. Н. Коммуникативные технологии в обучении РКИ. — СПб.: Речь, 2012. — 256 с.
5. Canale M., Swain M. Theoretical bases of communicative approaches to second language teaching and testing. // Applied Linguistics. — 1980. — Vol. 1, No. 1. — P. 1–47.
6. Щукин А. Н. Коммуникативная компетенция в обучении русскому языку как иностранному. — М.: Наука, 2011. — 368 с.

LANGUAGE AS A WEAPON: LEXICO-STYLISTIC AND SYNTACTIC MECHANISMS OF INFORMATION WARFARE

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ЯЗЫК КАК ОРУЖИЕ: ЛЕКСИКО-СТИЛИСТИЧЕСКИЕ И СИНТАКСИЧЕСКИЕ МЕХАНИЗМЫ ИНФОРМАЦИОННОЙ ВОЙНЫ

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Abstract

The article examines the linguistic mechanisms of influence in the context of information warfare using the example of Donald Trump's public speeches. Special attention is paid to the use of lexical, stylistic and syntactic means, including epithets, metaphors, lexical repetitions, antitheses, emphatic constructions, syntactic parallelism and inversion. It is shown how these techniques contribute to the formation of emotional coloring of speech, enhance expressiveness and manipulate audience perception. Conceptual metaphors and their role in interpreting complex political phenomena are considered, as well as ways to consolidate certain ideas in the minds of listeners through repetition and structuring of utterances. The article illustrates that language tools are a key tool of information warfare and serve as an effective way to influence mass consciousness.

Аннотация

В статье рассматриваются языковые механизмы воздействия в рамках информационной войны на примере публичных выступлений Дональда Трампа. Особое внимание уделяется использованию **лексико-стилистических и синтаксических средств**, включая эпитеты, метафоры, лексические повторы, антитезы, эмфатические конструкции, синтаксический параллелизм и инверсию. Показано, как эти приёмы способствуют формированию эмоциональной окраски речи, усилению выразительности и манипулированию восприятием аудитории. Рассмотрены концептуальные метафоры и их роль в интерпретации сложных политических явлений, а также способы закрепления определённых идей в сознании слушателей через повторение и структурирование высказывания. Статья иллюстрирует, что языковые средства являются ключевым инструментом информационной войны и служат эффективным способом воздействия на массовое сознание.

Keywords: information war, political discourse, linguistic manipulation, lexico-stylistic means, syntactic means, epithet, metaphor, lexical repetition, antithesis, inversion, syntactic parallelism, conceptual metaphor, impact on the audience.

Ключевые слова: информационная война, политический дискурс, языковая манипуляция, лексико-стилистические средства, синтаксические средства, эпитет, метафора, лексический повтор, антитеза, инверсия, синтаксический параллелизм, концептуальная метафора, воздействие на аудиторию.

Введение

Лексико-стилистические средства представляют собой наиболее комплексную категорию инструментов языковой манипуляции. Они объединяют разнообразные средства выразительности и стилистические приёмы, основанные на семантических, прагматических и функциональных особенностях отдельных лексических и фразеологических единиц. В эту группу включаются эмоционально окрашенная лексика, фразеологизмы, эвфемизмы, метафоры и другие языковые средства.

Эмоционально окрашенная лексика — это языковые единицы, которые помимо основного денотативного значения несут дополнительные экспрессивные и эмоциональные функции. Их употребление, как правило, детерминировано функциональным стилем (книжным или разговорным) и конкретной коммуникативной ситуацией. Авторы текстов осуществляют целенаправленный выбор лексики, соотнося её с избранным стилем и коммуникативной целью, с тем чтобы усилить воздействие на адресата [Леонтьев 2001].

Например, элементы разговорной лексики, включающие слова повседневного обихода могут использоваться в публичных выступлениях политиков для смягчения напряжённости и фокусирования внимания аудитории на ключевых компонентах высказывания. Этот приём создаёт иллюзию равноправного диалога и способствует эффекту сближения с так называемым «простым народом» [Гаврилов 2013], что повышает убедительность и эмоциональное вовлечение слушателей.

Фразеологизмы в политическом дискурсе

Фразеологизмы занимают особое место в политическом дискурсе, поскольку их использование носит массовый и повседневный характер, что делает данный феномен предметом систематических лингвистических исследований. В текст фразеологические единицы могут вводиться как в **исходной форме**, так и в **трансформированном виде** с заменой отдельных компонентов, что позволяет создавать образность, эмоциональную выразительность и акцентировать значимые элементы высказывания.

Так, в речах российских политиков встречаются следующие примеры: «Мы часто ломаем голову, как найти управленцев на местах в субъектах Российской Федерации» (Медведев Д.А.), «Я не перестаю удивляться тому, как наши партнеры раз за разом, как у нас в России говорят, наступают на одни и те же грабли, то есть совершают одни и те же ошибки» (Путин В.В.), «Да, конечно, политикам в США очень выгодно перед выборами в своей стране поставить Россию на колени» (Дугин А.).

Особое внимание заслуживает лексикон С.В. Лаврова, который демонстрирует наиболее активное использование фразеологизмов в российском политическом дискурсе: «Мы считаем, что хотя бы должны покраснеть те, кто выдвигает такие обвинения в наш адрес, пытаясь свалить с больной головы на здоровую; Мы не вмешиваемся в эти разборки, принципиально стоим в стороне». Применение подобных единиц позволяет политическим деятелям не только оживить текст, но и стратегически **управлять эмоциональным восприятием аудитории**, создавая эффект убедительности и авторитетности.

Таким образом, фразеологизмы в политическом дискурсе выполняют двойную функцию: с одной стороны, они структурируют высказывание и придают ему образность, с другой — усиливают эмоциональное и прагматическое воздействие на слушателей, что делает их ключевым инструментом в публичной коммуникации политиков.

Эвфемизация как способ влияния в политическом дискурсе

Не менее значимым способом воздействия на аудиторию является эвфемизация. Эвфемизмы представляют собой эмоционально нейтральные языковые единицы, которые позволяют говорящему заменять грубые, резкие или социально некорректные выражения более мягкими и тактичными формулировками. Так, в повседневной речи используются такие замены, как «полный» вместо «толстый», «пожилой» вместо «старый», «уклониться от истины» вместо «солгать».

Л.П. Крысин выделяет различные сферы применения эвфемизмов в социальной практике, особое внимание уделяя политической деятельности. Любая коммуникация политиков, особенно дипломатов, должна соответствовать нормам политической корректности, что делает их речь инструментом решения конкретных коммуникативных задач. В частности, политические высказывания направлены на информирование массовой аудитории о важных событиях или проблемах, при этом часто требуется **смягчить негативные оценки**, скрыть социально чувствительные аспекты или минимизировать конфликтные ситуации.

Существуют различные виды эвфемизаций. Так, применяются эвфемизмы для смягчения дискриминации по признаку физического или психического здоровья: «инвалид» → «человек с ограниченными возможностями»; для гендерной идентификации: «стюардесса» → «стюард»; для повышения престижа профессий: «уборщик» → «инженер по санитарии»; для смягчения расовой принадлежности: «негр» → «афроамериканец»; а также для обозначения социально-экономического положения: «бедняк» → «человек с низким уровнем дохода».

В российских политических коммуникациях эвфемизация также широко используется для сглаживания дискуссионных или конфликтных тем. Например, в ходе «Прямой линии» В.В. Путин применил эвфемистическую формулировку: «Это только через очень тяжелые внутренние конфликты возможно», что позволяет смягчить восприятие сложной социальной ситуации и подчеркнуть деликатность подхода к проблеме.

Таким образом, эвфемизация выполняет в политическом дискурсе **двойную функцию**: с одной стороны, она снижает потенциальный конфликтный заряд высказывания, а с другой — обеспечивает возможность стратегического воздействия на аудиторию, сохраняя эмоционально нейтральную и социально корректную форму текста.

Дисфемизм и метафоризация в политическом дискурсе

Противоположным эвфемизму языковым феноменом является дисфемизм, представляющий собой замену нейтральной или нейтрально окрашенной единицы на более грубое, эмоционально заряженное выражение. Дисфемизация широко используется средствами массовой информации с целью **преувеличения и нагнетания эмоционального напряжения** у аудитории. Так, представители определённых социальных или национальных групп могут быть обозначены терминами, несущими негативную оценку, например «убийцы» или «слабые жертвы». Подобное нагнетание способствует суггестивному воздействию на сознание людей, формируя устойчивые эмоциональные реакции и стереотипы.

Немаловажным компонентом манипулятивного языкового аппарата является метафоризация. Метафора выступает одним из наиболее эффективных механизмов воздействия как в политическом дискурсе, так и в СМИ. По мнению специалиста по теории лингвистического развития А.А. Любимовой, «ее использование сводится к подмене рационального обоснования суждения иррациональным» [Любимова 2006]. Иными словами, метафорическое выражение позволяет преподнести интерпретацию или оценку как основной аргумент, что формирует у аудитории **яркий эмоциональный и экспрессивный образ**, с которым ассоциируются определённые социальные или политические дефиниции.

В качестве примера можно привести высказывания С.В. Лаврова: «Мы продвигаем политику…», «Мы уделяем большое внимание…», «Наша дипломатия будет защищать интересы России». Использование метафор в подобных высказываниях позволяет структурировать информацию, подчеркивать приоритетные позиции и формировать у слушателей эмоционально окрашенное восприятие ключевых аспектов внешней и внутренней политики.

Таким образом, дисфемизм и метафоризация выполняют в политическом дискурсе **различные, но взаимодополняющие функции**: первый усиливает эмоциональное напряжение и способствуют манипуляции, второй формирует выразительные и убедительные образы, с которыми аудитория соотносит политические позиции и оценочные суждения.

Особенности интерпретации высказываний лидеров в СМИ

Политическая коммуникация занимает ключевое место в жизнедеятельности современного общества. На основе анализа политических дискурсов можно не только оценивать развитие отношений между различными государствами, но и выявлять цели, задачи и приоритеты политиков, а также скрытые манипулятивные стратегии в сфере общественно-политической жизни.

Для детального изучения механизмов языкового манипулирования в публичной речи мы рассмотрели выступления Дональда Трампа, американского государственного и политического деятеля, занимавшего пост президента США с 20 января 2017 года по 20 января 2021 года. Профессиональные лингвисты, проводившие анализ его высказываний, отмечают, что при выходе за рамки заранее подготовленного сценария его речь становится не только сложной для восприятия, но порой практически непереводимой в строгую логическую структуру.

Идеостиль Трампа характеризуется **быстрой сменой мыслей и нарушением последовательности**, что создает впечатление сумбурности. Так, одна из типичных фраз — «The Iran deal is bad for the United States» («Сделка с Ираном опасна для Соединенных Штатов») — может быть прервана рассуждениями о его дяде, собственном образовании, ядерной энергии, интеллекте женщин и мастерстве переговоров иранцев.

Тем не менее, именно эта особенность речи позволяет утверждать, что публичные выступления Дональда Трампа обладают высокой **эмоциональностью, образностью и экспрессивностью**, что делает его высказывания эффективным инструментом влияния на аудиторию и объектом пристального лингвистического анализа.

Стилистические средства выразительности на лексическом уровне

На лексическом уровне выступления политиков нередко насыщены различными стилистическими средствами выразительности, одним из которых является эпитет. Эпитеты позволяют автору

выразить субъективную оценку событий, действий или явлений, демонстрируя собственную позицию по рассматриваемой теме и формируя у аудитории эмоциональное восприятие информации.

В речах Дональда Трампа эпитеты встречаются особенно часто. Например:

• «…I stand before you this morning to announce a very important and very beautiful, I think, development for our freedom…» / «…я стою перед вами сегодня утром, чтобы объявить об очень важном и очень красивом, я думаю, событии для нашей свободы…»;

• «Let me also express my incredible appreciation to the thousands of bold, young, and proud American patriots that are with us today.» / «Позвольте мне также выразить свою невероятную признательность тысячам смелых, молодых и гордых американских патриотов, которые сегодня здесь с нами»;

• «Think about that because nobody's done what we did in four years, the greatest economy, we will be talking about it.» / «Подумайте об этом, потому что никто не сделал того, что мы сделали за эти четыре года, величайшая экономика, мы будем говорить об этом»;

• «She's been great and strong.» / «Она была великолепна и сильна»;

• «Today I want to send our profound and everlasting gratitude to every Arizona Republican who had the fortitude and the backbone to defy the lying media.» / «Сегодня я хочу выразить нашу глубокую и вечную благодарность каждому республиканцу из Аризоны, у кого хватило мужества бросить вызов лживым СМИ».

Эпитеты усиливают красочность и выразительность выступлений, помогают акцентировать внимание на наиболее значимых для политика аспектах и эмоционально вовлекать аудиторию. В случае Трампа такой приём создаёт доверительный тон общения с народом и одновременно отражает личное отношение американского лидера к происходящим событиям, подчеркивая его субъективную оценку политической и социальной ситуации.

Использование метафоры в политическом дискурсе позволяет политикам осуществлять специфическое воздействие на сознание аудитории. Метафорические конструкции помогают представить сложные политические явления и концепции в более наглядной и доступной форме, облегчая их восприятие и интерпретацию.

В речах Дональда Трампа метафоры встречаются на разных уровнях. Например:

• «She had 93 million sitting in the bank and he was two down and he was going to get blown away and I endorsed him and he went up 20 points, 20.» / «У нее в банке лежало 93 миллиона. Он же два раза потерпел поражение, и вот-вот собирался сдуться, тогда как я поддержал его, и он сумел подняться аж на 20 баллов, на 20»;

• «I will fight for you with every breath in my body.» / «Я буду бороться за Вас каждой клеткой своего тела»;

• «I will protect your rights with all I can do.» / «Я буду защищать Ваши права, как только могу»;

• «Now it's time for America to bind the wounds of division.» / «Пришло время Америке заживить раны, вызванные разделением»;

• «When you open your heart to patriotism, there is no room for prejudice.» / «Когда Вы открываете двери своего сердца патриотизму, в нем нет места предрассудкам»;

• «Tonight, I am calling on the Congress to finally close the deadly loopholes that have allowed MS-13, and other criminals, to break into our country.» / «Сегодня вечером я призываю Конгресс, наконец, закрыть смертельные лазейки в законах, которые позволили MS-13 и другим преступникам проникнуть в нашу страну».

Метафоры в этих высказываниях создают яркие эмоциональные образы, которые усиливают экспрессивность речи и направляют восприятие аудитории. Благодаря им сложные события и социальные процессы интерпретируются через понятные и наглядные визуальные и эмоциональные конструкции, что способствует манипулированию общественным мнением и формированию желаемого мировосприятия.

Типы метафор и их использование в политическом дискурсе

В языкознании различают несколько типов метафор, каждый из которых выполняет специфические функции в процессе коммуникации.

1. Номинативная метафора — «сухая», которая практически не несёт образного значения и называется «стертой». К примеру: «ручка двери», «ножка стула».

2. Образная метафора формирует скрытое сравнение и возникает, когда в сознании человека активируется идентичный образ, позволяющий интерпретировать свойства и функции определённых объектов окружающей реальности.

3. Антропоморфная метафора возникает на основе сравнения с человеком и стремления уподобить объекты действительности человеческим чертам, например «ушко иголки».

4. Когнитивная (концептуальная) метафора, по словам Джорджа Лакоффа и Марка Джонсона, представляет собой «метафоры, которыми мы живем». Она формирует концепт, объединяющий две или более когнитивные структуры на основе их сходства и общих характеристик. Примером может служить использование глагола «вертеться» в значении «постоянно находиться в мыслях».

В речи Дональда Трампа особенно преобладает использование концептуальной метафоры. Например, обсуждая рост потока иммигрантов и повышение уровня террористических угроз в стране, Трамп применяет концепт «animals» — «животные»:

• «Illegal immigrants with criminal records (ordered deported from our country) are tonight roaming free.» / «Нелегальные иммигранты с криминальным прошлым, которых было приказано депортировать из нашей страны, сегодня вечером свободно прочесывают уголки города».

Также концептуальная метафора проявляется в адресованных оппонентам высказываниях, например:

• «They are throwing money at her.» / «Они бросаются в неё деньгами», где подразумевается бездумное, хаотичное действие, аналогичное поведению животного, характеризующееся недостаточно развитым ценностным аппаратом.

Применение концептуальных метафор позволяет политическому деятелю не только упрощать сложные явления для восприятия аудитории, но и формировать эмоционально окрашенные образы, способные воздействовать на сознание слушателей и создавать желаемую интерпретацию политических событий.

Дополнительные концепты концептуальных метафор в политическом дискурсе

Помимо концепта «животные», в речах Дональда Трампа активно используются другие концептуальные метафоры, позволяющие структурировать сложные политические явления через наглядные образы.

Так, концепт «plant» («растение») используется для обозначения распределения ресурсов и власти:

• «A small group in our nation's Capital has reaped the rewards of government.» / «Небольшая группа в столице нашей страны пожинает плоды власти». Здесь метафора «пожинать плоды» переносит действие из биологической сферы на социально-политическую, позволяя воспринимать абстрактные процессы как результат конкретных усилий и решений.

Не менее часто встречается концепт «money» («деньги»), который в речи Трампа интегрируется с временными и деятельностными категориями. Например:

• «…time I have spent with the mothers and fathers.» / «…время, которое я провел с их родителями»;

• «Spent my entire life in business.» / «Всю свою жизнь я провел в бизнесе».

Эти примеры иллюстрируют метафору «time – money» («время – деньги»), раскрывающую ценность времени как ресурса, сопоставимого с финансовыми возможностями. В более яркой форме это проявляется в утверждении:

• «I have made billions of dollars in business making deals – now I'm going to make our country rich again.» / «Я заработал миллиарды долларов, работая в сфере бизнеса и заключая сделки, а теперь я собираюсь сделать нашу страну богатой», где идея «money will bring you to success» («деньги приведут к успеху») подкрепляет стратегическую и эмоциональную убедительность высказывания.

Еще одной часто используемой метафорой является «машинная метафора» (the machine metaphor), сравнивающая человека, его действия и государственные процессы с техническими механизмами. Она позволяет обозначить целостность системы, эффективность и взаимосвязь элементов власти и общества:

• «We are going to fix the system.» / «В планах починить эту систему»;

• «We can fix this problem so quickly.» / «В наших силах решить данную проблему достаточно быстро».

Применение этих концептуальных метафор способствует не только упрощению сложных идей для восприятия широкой аудитории, но и созданию эмоционально насыщенных и образных конструкций, которые укрепляют стратегическое и манипулятивное воздействие на сознание слушателей.

Лексический повтор как средство манипуляции в политическом дискурсе

Лексический повтор является одним из наиболее эффективных средств манипулятивного воздействия, поскольку именно он обеспечивает многократное актуализирование одной и той же идеи в речи. Иными словами, благодаря повтору определённая точка зрения или позиция с большей вероятностью закрепляется в общественном сознании и воспринимается как значимая и самоочевидная.

В публичных выступлениях Дональда Трампа данный приём используется достаточно активно. Так, в следующем высказывании повтор служит средством усиления положительной оценки адресата:

• «But Sonny, you're really an amazing guy and a brave guy and a strong smart guy». / «Но, Сынок, ты действительно удивительный парень, храбрый парень и сильный, умный парень».

Аналогичную функцию выполняет повтор в обращении к представителям власти:

• «My duty, and the sacred duty of every elected official in this chamber, is to defend Americans – to protect their safety, their families, their communities, and their right to the American Dream». / «Мой долг, и священный долг каждого избранного должностного лица в этом зале, состоит в том, чтобы защищать американцев — защищать их безопасность, их семьи, их сообщества и их право на американскую мечту».

Особенно показательным является использование повторов в контексте апелляции к коллективной идентичности:

• «We are one nation and their pain is our pain. Their dreams are our dreams. And their success will be our success». / «Мы — одна нация, и их боль — это наша боль. Их мечты — это наши мечты. А их успех будет нашим успехом».

Стилистический эффект повторения заключается в акцентировании ключевых слов, словосочетаний и предложений, что усиливает их значимость и эмоциональное воздействие. Так, повтор лексем *pain, dream, success* не только подчёркивает их смысловую доминантность, но и формирует у аудитории чувство доверия, сопричастности и единства, тем самым оказывая прямое влияние на мнение и эмоциональное состояние слушателей.

Отлично! Я доведу ваш фрагмент до завершённого вида, добавив плавные переходы, академическую связность и завершу последний пример.

Использование антитезы и синтаксических средств в речи

Немаловажной особенностью речи Дональда Трампа является активное использование противопоставлений, или антитезы, что позволяет подчеркнуть контраст между различными явлениями и событиями. Антитеза создаёт наглядное противопоставление, усиливая эмоциональное воздействие и делая сообщение более убедительным.

Примеры из речей Трампа демонстрируют данный приём:

• «Washington flourished, but the people did not share in its wealth. Politicians prospered, but the jobs left and the factories closed. The establishment protected itself, but not the citizens of our country.» / «Вашингтон процветал, но люди не разделяли его богатства. Политики процветали, но рабочие места оставались, а фабрики закрывались. Истеблишмент защищал себя, но не граждан нашей страны.»

• «As we strengthen friendships around the world, we are also restoring clarity about our adversaries.» / «Укрепляя дружеские отношения по всему миру, мы также восстанавливаем ясность в отношении наших противников.»

Антитеза усиливает контрастность описываемых явлений, акцентирует внимание на различиях и создаёт у аудитории ясное представление о «правильном» и «неправильном», «успешном» и «несправедливом».

Помимо этого, в речи Трампа активно используются синтаксические средства выразительности, в частности инверсия — нарушение обычного порядка слов для выделения наиболее значимой информации. Как и другие синтаксические приёмы, инверсия усиливает эмоциональность и выразительность высказывания, позволяя акцентировать ключевые моменты.

Примеры инверсии в выступлениях политика:

• «After years of wage stagnation, we are finally seeing rising wages.» / «После нескольких лет стагнации заработной платы мы, наконец, наблюдаем рост заработной платы.»

• «It's a movement comprised of Americans from all races, religions, backgrounds and beliefs who want and expect our Government to serve the people, and serve the people it will

Синтаксические средства выразительности: параллелизм и эмфатические конструкции

В речи Дональда Трампа широко используется синтаксический параллелизм, который предполагает одинаковое или сходное строение соседних предложений. Этот приём усиливает ритмичность и эмоциональное воздействие высказывания, делает его более запоминающимся и способствует закреплению ключевых идей в сознании аудитории.

Примеры параллелизма в выступлениях Трампа:

• «Thank you, Warren. Thank you, Warren. He's here someplace. Thank you, Warren.» / «Спасибо, Уоррен. Спасибо, Уоррен. Он где-то здесь. Спасибо, Уоррен.»

• «We did win. We really did. Not me. We all won. We won. Everybody.» / «Мы действительно победили. Мы действительно это сделали. Не я. Мы все выиграли. Мы победили. Все.»

• «In my opinion, there is no way they win elections without cheating. There's no way. There's no way. No second amendment.» / «На мой взгляд, они никак не могут выиграть выборы без обмана. Нет никакого способа. Нет никакого способа. Никакой второй поправки.»

• «Kentucky is a great place. I love Kentucky. They love me and I love them.» / «Кентукки — замечательное место. Я люблю Кентукки. Они любят меня, и я люблю их.»

• «We will bring back our jobs. We will bring back our borders. We will bring back our wealth. And we will bring back our dreams.» / «Мы вернем себе наши рабочие места. Мы вернем наши границы. Мы вернем наше богатство. И мы вернем наши мечты.»

Параллелизм позволяет не только ритмически усилить эмоциональное воздействие, но и чётко выразить программу и цели политика, делая ключевые идеи доступными для восприятия широкой аудитории.

Кроме того, Трамп активно использует эмфатические конструкции и обратный порядок слов на лексическом и грамматическом уровнях. Этот приём способствует правильной расстановке логического ударения и выделению наиболее значимых элементов высказывания.

Примеры эмфатических конструкций:

• «And it is the people who are making America great again.» / «Именно эти люди снова делают Америку великой.»

• «What truly matters is not which party controls our government, but whether our government is controlled by the people.» / «Что действительно важно, так это не то, какая партия контролирует наше правительство, а то, контролируется ли наше правительство народом.»

Таким образом, сочетание параллелизма и эмфатических конструкций позволяет Трампу не только структурировать речь и подчеркнуть важные идеи, но и эффективно воздействовать на эмоции и восприятие аудитории, что является важным инструментом политической риторики и манипуляции.

Следует отметить, что на лексическом уровне в политическом дискурсе преобладают эпитеты, метафоры, лексические повторы и антитезы, тогда как на синтаксическом уровне наиболее часто используются эмфатические конструкции, синтаксический параллелизм и инверсия. Такое сочетание средств позволяет не только выразительно и эмоционально передавать мысли политика, но и эффективно воздействовать на восприятие аудитории, закрепляя необходимые идеи и позиции в сознании слушателей.

Заключение

Информационная война представляет собой многогранное явление современной действительности. Её механизмы могут быть задействованы как для противостояния между государствами, так и для манипуляции сознанием общественности, используя различные лингвистические средства выразительности.

В ходе нашего исследования было установлено, что понятие информационной войны возникло ещё в период глобализации и привлекло внимание учёных и исследователей, стремившихся разобраться с этим новым феноменом. Из-за относительной новизны явления специалисты традиционно разделяются на три группы в зависимости от подходов к изучению:

1. Одни исследователи рассматривают информационное противоборство с военно-технической позиции, анализируя технические аспекты информационных операций.
2. Другие пытаются найти комплексное решение, объединяющее различные сферы знаний для изучения информационных конфликтов.
3. Третьи полагают, что информационная война является прежде всего пропагандистским и психологическим инструментом, направленным на аудиторию и реализуемым посредством лексико-стилистических средств в средствах массовой информации.

Таким образом, информационная война выступает как многоуровневый процесс, в котором лингвистические средства становятся ключевыми инструментами воздействия, обеспечивая манипулятивное и стратегическое управление сознанием аудитории.

современном медиапространстве выделяют различные **методы информационной войны**, направленные на давление на общественное мнение и формирование идеологически предпочтительных установок в сознании людей. При этом наибольшее значение в процессе манипуляции приобретают **языковые средства выразительности**, с помощью которых осуществляется воздействие на массовую аудиторию. Языковое манипулирование может проявляться на различных уровнях — **стилистическом, лексическом, синтаксическом и грамматическом**.

Анализ публичных выступлений Дональда Трампа показал, что **лексико-стилистические средства** составляют наиболее значимую часть механизмов воздействия. Речь политика, обладающая высокой **эмоциональностью и экспрессивностью**, характеризуется использованием на лексическом

уровне **эпитетов, метафор, лексических повторов и антитез**, тогда как на синтаксическом уровне преобладают **эмфатические конструкции, синтаксический параллелизм и инверсия**. Такое сочетание приёмов позволяет не только **усилить выразительность высказываний**, но и **эффективно направлять восприятие аудитории**, закрепляя в сознании слушателей необходимые идеи и позиции.

Информационная война – это многогранное явление современной действительности. Механизмы информационной войны могут быть задействованы как для противостояния между государствами, так и для манипуляции сознанием общественности, с использованием лингвистических средств выразительности.

В результате нашего исследования мы выяснили, что само понятие информационной войны возникло еще в период глобализации и привлекло внимание учёных и исследователей, готовых разобраться с новым феноменом. Из-за новизны явления специалисты разделились на три группы, в зависимости от подходов к изучению данной тематики. Одни рассматривали информационное противоборство со стороны военно-технического аспекта проблемы, другие пытались найти комплексное тому решение, а третьи предполагали, что такой тип войны является воплощением пропаганды, психологически нацеленной на аудиторию и реализуемой лексико-стилистическими средствами в массовой информации.

Выделяют различные методы информационной войны в медиа пространстве, которые направлены на давление и формирование идеологически правильного мнения в сознании людей. Однако больше всего, во время такой манипуляции, задействуются языковые средства выразительности для дальнейшего влияния на массы. Языковое манипулирование может быть выражено на стилистическом, лексическом, синтаксическом и грамматическом уровнях.

ИСТОЧНИКИ

The New York Times. — 2002. — 10 ноября [Электронный ресурс]. — Режим доступа: http://www.nytimes.com/2002/11/ 10/world/threats-responses-military-war-plan-for-iraq-calls-for-big-force-quick-strikes.html?pagewanted = all&src=pm (дата обращения: 14.09.2012).

The New York Times. — 2003. — 2 февраля [Электронный ресурс]. — Режим доступа: http://www.nytimes.com/2003/02/ 02/world/threats-responses-military-war-plan-calls-for-precision-bombing-wave-break-iraqi.html ? pagewanted = all&src = pm (дата обращения: 14.09.2012).

The New York Times. — 1999. — 31 марта [Электронный ресурс]. — Режим доступа: http://www.nytimes.com/1999/03/ 31/opinion/31iht-edfred.2.t.html?gwh = 83A0BA85448D7A3128A C09S0265C41AF_ (дата обращения: 14.09.2012).

The New York Times. — 1994. — 27 августа [Электронный ресурс]. — Режим доступа: http://www.nytimes.com/1994/ 0S/27/opinion/balkans-need-more-talking-not-more-fighting-the-right-to-access.html (дата обращения: 14.09.2012).

The New York Times. — 2003. — 22 апреля [Электронный ресурс]. — Режим доступа: http://www.nytimes.com/cfr/ international/20030422faessayv82n3_dawisha.html ? pagewanted = print&position = (дата обращения: 14.09.2012).

Независимая газета. — 2012. — 10 августа [Электронный ресурс]. — Режим доступа: http://www.ng.ru/politics/news/2012/ 08/10/1344589106.html (дата обращения: 15.09.2012).

Коммерсант. — 2012. — 10 августа [Электронный ресурс]. — Режим доступа: http://www.kommersant.ru/doc/ 199S605 (дата обращения: 15.09.2012).

The New York Times. — 2007. — 19 мая [Электронный ресурс]. — Режим доступа: http://www.nytimes.com/2007/05/ 19/world/americas/19panama.html (дата обращения: 14.09.2012).

Российская газета. — 2012. — 21 мая [Электронный ресурс]. — Режим доступа: http://www.rg.ru/sujet/4591/in-dex.html (дата обращения: 15.09.2012).

Российская газета. — 2010. — 25 мая [Электронный ресурс]. — Режим доступа: http://www.rg.ru/2010/05/25/bulava-anons.html (дата обращения: 15.09.2012).

Общие теоретические источники по манипуляции языком

1. Ishani Maitra & Mary Kate McGowan, *Linguistic Manipulation* — глава в книге *Words in Action: An Introduction to the Social Philosophy of Language*, Oxford University Press (2025). Обсуждается природа языковой манипуляции, её механизмы и способы обхода рационального восприятия.
2. Ceda Gasparyan & Rafayel Harutyunyan, *Manipulative Speech: A Theoretical Overview* — обзор теоретических подходов к языковой и психологической манипуляции в политическом дискурсе.
3. Диссертация «Языковые средства и речевые приёмы манипуляции информацией в СМИ» — анализ языковых средств манипуляции и их роли в информационных текстах (русский язык).
4. «Язык социально-психологического воздействия (манипуляционный язык)» — материалы, структурирующие механизмы языкового воздействия (лексические и синтаксические способы).

Источники по манипуляции в политическом дискурсе

5. R. I. Zaripov, *Manipulation Impact through Metaphors in Political Discourse* — статья о роли метафоры как средства манипуляции в политической речи.
6. The Strategic Use of Metaphor in Political Discourse: Critical Metaphor Analysis — анализ стратегического использования метафор для формирования политических нарративов и восприятия.
7. “A Semantic and Rhetorical Study of Manipulation in Two English and Arabic Political Speeches” — сравнительный анализ манипулятивных риторических средств в политических выступлениях (в том числе Дональда Трампа).
8. «Языковые средства художественной выразительности как способ речевого воздействия» — недавняя статья о влиянии стилистических фигур (метафоры, эпитеты, др.) в политических обращениях лидеров.

Список использованной литературы

1. Баранов А. Н., Ю. Н Караулов. Словарь русских политических метафор. М. : Помовский и партнеры, 1994. 351 с.
2. Астаркин А.С. Приемы и средства ведения информационной войны в СМИ // Коммуникология: электронный научный журнал. 2020. №1. URL: https://cyberleninka.ru/article/n/priemy-i-sredstva-vedeniya-informatsionnoy-voyny-v-smi (дата обращения: 18.05.2022).
3. Барабаш В.В. Информационные войны и медийное пространство: теоретические аспекты новейших изменений / В. В. Барабаш, Е. А. Котеленец // Известия высших учебных заведений. Поволжский регион. Гуманитарные науки. – 2016. – № 3 (39). – С. 150–158. DOI: 10.21685/2072-3024-2016-3-14
4. Барабаш В.В., Котеленец Е.А. Информационные войны и медийное пространство: теоретические аспекты новейших изменений // Известия ВУЗов. Поволжский регион. Гуманитарные науки. 2016. №3 (39). URL: https://cyberleninka.ru/article/n/informatsionnye-voyny-i-mediynoe-prostranstvo-teoreticheskie-aspekty-noveyshih-izmeneniy (дата обращения: 18.05.2022).
5. Белова Н.Е. Особенности дискурса информационной войны // Приволжский научный вестник. 2015. №6-3 (46). URL: https://cyberleninka.ru/article/n/osobennosti-diskursa-informatsionnoy-voyny (дата обращения: 18.05.2022).
6. Борхсениус А.В. Информационная война: проблема теоретической интерпретации // Вестник Российского университета дружбы народов. Серия: Государственное и муниципальное управление. 2016. №1. URL: https://cyberleninka.ru/article/n/informatsionnaya-voyna-problema-teoreticheskoy-interpretatsii (дата обращения: 12.05.2022).
7. Васильев А.Д. Информационная война: лингвистический аспект – 2016, 10-16 с.
8. Володина М.Н. Язык массовой коммуникации – основное средство информационного воздействия на общественное сознание // Язык СМИ как объект междисциплинарного исследования. Тезисы докладов международной научной конференции. М.: Изд-во МГУ, 2001. – С. 11-13.
9. Гаврилов А.А. Лингвистические средства воздействия СМИ на общественное сознание // ОНВ. 2013. №1 (115). URL: https://cyberleninka.ru/article/n/lingvisticheskie-sredstva-vozdeystviya-smi-na-obschestvennoe-soznanie (дата обращения: 18.05.2022).
10. Григорьев М. Методы ведения информационных войн – 2005, 102 с.
11. Доценко Е.Л. Психология манипуляции: Феномен, механизмы, защита. – М.: ЧеРо, 1997. – 342 с.
12. Желтухина М.Р. Тропологическая суггестивность масс–медиального дискурса: о проблеме речевого воздействия тропов в языке СМИ: Монография. – М.: Ин–т языкознания РАН; Волгоград: Изд–во ВФ МУПК, 2003. – 656 с.

13. Завадский И.И. Информационная война – что это такое? – 1996, 14-28 с. Кара-Мурза С. Манипуляция сознанием. Век XXI – 2015, 76 с.

14. Кибрик А. А. Когнитивные исследования по дискурсу // Вопросы языкознания. 1994. № 5.

15. Лакофф Дж. Джонсон М. Метафоры, которыми мы живем // Язык и моделирование социального взаимодействия. Благовещенск: Благовещенский гуманитарный фонд им. И.А. Бодуэна де Куртенэ, 1998. - С. 126 – 173.

16. Леонтьев А.А. Образ события в СМИ и возможности его искажения. Язык СМИ как объект междисциплинарного исследования. Тезисы докладов международной научной конференции. М.: Изд-во МГУ, 2001. – С. 39-41.

17. Лищук А.Ю., Ланцова Л.К. Роль эвфемизмов в политическом дискурсе // Иностранные языки в контексте межкультурной коммуникации. 2020. №XII. URL: https://cyberleninka.ru/article/n/rol-evfemizmov-v-politicheskom-diskurse (дата обращения: 18.05.2022).

18. Любимова А.А. Интерпретация текста и языковое манипулирование в текстах современных западных средств массовой информации. // Вопросы интерпретации текста. Лингвистика и история литературы. - М.: МАКС Пресс, 2004. - с. 66-78.

19. Нежельский А.А. Теоретические основы исследования информационных войн и информационной безопасности государства // Власть. 2018. №6. URL: https://cyberleninka.ru/article/n/teoreticheskie-osnovy-issledovaniya-informatsionnyh-voyn-i-informatsionnoy-bezopasnosti-gosudarstva (дата обращения: 18.05.2022).

20. Опарина Е. О. Метафора в политическом дискурсе // Полит. наука. 2002. №3. URL: https://cyberleninka.ru/article/n/metafora-v-politicheskom-diskurse (дата обращения: 18.05.2022).

21. Панарин И.Н. СМИ, пропаганда и информационные войны – 1999, 222 с.

22. Порческу Г.В., Рублёва О.С. Лингвостилистические особенности политических выступлений (на Примере публичных выступлений Дональда Трампа) // Филологические науки. Вопросы теории и практики. 2019. №1. URL: https://cyberleninka.ru/article/n/lingvostilisticheskie-osobennosti-politicheskih-vystupleniy-na-primere-publichnyh-vystupleniy-donalda-trampa (дата обращения: 18.05.2022).

23. Почепцов Г. Г. Информационные войны. — М.: Рефлбук; Киев: Ваклер, 2000.

24. Почепцов Г. Г. Психологические войны. — М., 2002.

25. Расторгуев С. П. Информационная война. — М.: Радио и связь, 1998.

26. Расторгуев С. П. Философия информационной войны. — М., 2002.

27. Рюкова А. Р. Языковые средства воздействия в СМИ // Вестник Башкирск. ун-та. 2021. №4. URL: https://cyberleninka.ru/article/n/yazykovye-sredstva-vozdeystviya-v-politicheskom-diskurse (дата обращения: 18.05.2022).

28. Сковородников А.П., Копнина Г.А. Лингвистика информационно-психологической войны: к обоснованию и определению понятия // Политическая лингвистика. 2016. №1. URL: https://cyberleninka.ru/article/n/lingvistika-informatsionno-psihologicheskoy-voyny-k-obosnovaniyu-i-opredeleniyu-ponyatiya (дата обращения: 18.05.2022).

29. Щекотихин В. М. Информационная война. Информационное противоборство: теория и практика: моногр. / под общ. ред. канд. техн. наук, проф. В. М. Щекотихина. — М.: Академия ФСО России: ЦАТУ, 2011.

30. Любимова, А. А. Языковые аспекты воздействия на общественное сознание : дис. ... канд. филол. наук / А. А. Любимова. — М., 2006. — С. 140.

31. Леонтьев А.А. Образ события в СМИ и возможности его искажения. Язык СМИ как объект междисциплинарного исследования. Тезисы докладов международной научной конференции. М.: Изд-во МГУ, 2001. – С. 39-41.

32. Гаврилов А.А. Лингвистические средства воздействия СМИ на общественное сознание // ОНВ. 2013. №1 (115). URL: https://cyberleninka.ru/article/n/lingvisticheskie-sredstva-vozdeystviya-smi-na-obschestvennoe-soznanie (дата обращения: 18.05.2022).

33. Опарина Е. О. Метафора в политическом дискурсе // Полит. наука. 2002. №3. URL: https://cyberleninka.ru/article/n/metafora-v-politicheskom-diskurse (дата обращения: 18.05.2022).

34. Мансурова, А. И. Вербальные способы манипуляции общественным сознанием / А. И.

35. Мансурова // Вестник КГУ им. Н. А. Некрасова. — Казань : Изд-во КГУ, 2009. — № 1. — С. 71.

36. Кара-Мурза, С. Г. Манипуляция сознанием / С. Г. Кара-Мурза. — М. : Алгоритм, 2004. — С. 15S.

37. Зелинский, С. А. Информационно-психологическое воздействие на массовое сознание / С. А. Зелинский. — СПб. : СКИФИЯ, 200S. - С. 345.

38. Гутова, Ю. Трагедия на Кубани / Ю. Гутова // Русский репортер. — 2012. — № 27. — 12 июля [Электронный ресурс]. — Режим доступа: http://www.rusrep.ru/article/2012/07/10/ tragediya/ (дата обращения: 15.09.2012).

39. Татьяна Петровна Куранова 1 , Валерия Николаевна Гаврютина 2 Метафора в современном политическом дискурсе (на примере выступлений В. В. Путина, С. В. Лаврова, Д. С. Пескова)

Philosophical sciences

THE HISTORICAL AND PHILOSOPHICAL DEVELOPMENT, CURRENT STATE AND FUTURE PROSPECTS OF THE CONCEPT OF CULTURE

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1. Definition of Culture and Basic Concepts

Culture as a social phenomenon is characterized by a wide variety of approaches to its definition and interpretation, which is обусловлено the complexity and multidimensional nature of this concept. The diversity of existing interpretations of culture is explained by the fact that, within philosophical analysis, it appears as an integral system of material, social, and spiritual values, as well as modes of activity, norms of behavior, and symbolic forms that are shaped in the course of the historical development of society.

Culture performs the function of transmitting accumulated social experience from generation to generation and thus determines the characteristics of the way of life both of society as a whole and of the individual. Through culture, value orientations, behavioral models, and ways of comprehending the surrounding world are consolidated, which makes it the most important mechanism of social continuity and identity.

Within the theoretical understanding of culture, several key components are usually distinguished, each reflecting a particular aspect of human activity. **Material culture** includes the totality of objects and artifacts created by humans—tools of labor, technologies, architectural structures, and other artifacts that reflect the level of technical and economic development of society. **Spiritual culture** encompasses intangible forms of cultural life, such as religion, art, science, and philosophy, in which a person's worldview and value orientations are expressed.

Social culture is represented by a system of norms, traditions, and social institutions that regulate interactions among people in society and ensure its stability and integrity. **Symbolic culture**, in turn, includes language, various sign systems, myths, and images through which communication and interpretation of reality are carried out.

In different historical periods, culture was conceptualized in different ways, which was associated with the dominant philosophical, religious, and scientific ideas of the time. Changes in views on culture reflected transformations in social consciousness and in the ways of understanding the place of the human being in the world.

2. The Historical and Philosophical Development of the Concept of Culture

"Culture is the cultivation of the spirit, similar to the cultivation of the land"
Cicero, *Tusculan Disputations*

2.1. The Ancient Period (6th century BCE – 5th century CE)

In the ancient period, culture was understood primarily as a process of the formation and education of the individual, as well as a means of the rational organization of social life. At the center of the ancient understanding of culture stood the human being as a rational creature, capable—through education, self-discipline, and moral perfection—of achieving harmony with the surrounding world and society.

The most significant philosophical concepts of culture were formed in the works of Socrates, Plato, and Aristotle. Socrates considered culture through the prism of self-knowledge and moral self-improvement, emphasizing the importance of a person's inner work on oneself. Plato linked culture with the education of citizens of the ideal state, where education and philosophy serve as means of forming a just and harmonious social order. Aristotle, in turn, understood culture as the result of purposeful rational human activity aimed at achieving the highest good—*eudaimonia*, that is, a full and virtuous life.

A special place in ancient philosophy was occupied by the Stoic school, whose representatives associated culture with life in accordance with nature and reason. The Stoics viewed cultural development as a path to inner freedom and stability, based on the cultivation of virtues, self-control, and acceptance of the universal cosmic order.

Cicero emphasized the educational character of culture by introducing the concept of *cultura animi*—"the cultivation of the soul"—pointing to the necessity of systematic spiritual and moral development of the individual (Cicero, M. T., *Tusculan Disputations*. Moscow: Nauka, 1975, p. 45).

Using an agrarian metaphor, he stressed that cultural development is similar to the cultivation of land: without systematic education and upbringing, the human spirit remains undeveloped. In this context, culture was understood as a process of continuous personal improvement aimed at the development of reason, moral qualities, and civic responsibility.

"Outside of God there is no true art and wisdom"
Thomas Aquinas, *Summa Theologica*

2.2. The Medieval Period (5th–15th centuries)

During the Middle Ages, the understanding of culture was closely connected with the religious worldview and the idea of service to God. Culture was regarded primarily as a means of spiritual salvation and as a form of expressing the divine plan in earthly life. All manifestations of cultural activity—art, education, philosophy, and social practices—were subordinated to religious values and Christian doctrine.

A significant contribution to the formation of the medieval understanding of culture was made by Augustine of Hippo, who viewed culture as a path to the salvation of the human soul through adherence to the divine order. In his teaching, earthly culture was contrasted with the "City of God"; however, it was emphasized that the true value of cultural activity lies in its orientation toward the spiritual transformation of the individual and the strengthening of faith.

The development of these ideas was continued in the works of one of the Church Fathers—Thomas Aquinas. He believed that culture is expressed in the subordination of earthly life to divine laws and in the harmonious coordination of reason and faith. According to Aquinas, human reason is capable of understanding the world; however, true wisdom and genuine art are possible only within the framework of divine revelation. Thus, culture acquired a normative character and was viewed as a form of realizing Christian virtues in everyday life.

Within this worldview, monastic culture acquired special significance and played an important role in the history of European civilization. Monasteries became centers of education, manuscript copying, and book preservation, which largely contributed to the preservation of ancient philosophical heritage, religious texts, and established norms of social life. Thus, medieval culture functioned not only as a spiritual practice but also as a mechanism for preserving and transmitting knowledge within a religiously oriented society.

"Knowledge without action is madness, and action without knowledge is vanity"
Al-Ghazālī, *The Revival of the Religious Sciences*

2.3. *The Muslim Philosophical Tradition (8th–15th Centuries)*

In the Muslim philosophical tradition, culture was regarded as an integral part of the religious and moral perfection of the human being, directed toward the comprehension of the will of Allah. The foundation of cultural life lay in the unity of faith, knowledge, and moral action, which found expression in philosophy, as well as in art, science, and everyday life.

Early Muslim thinkers such as Al-Kindī and Al-Fārābī associated culture with the development of reason and the formation of a virtuous individual within the framework of divine law—the Sharīʿa. Culture was understood by them as a means of harmonizing earthly and spiritual life, in which knowledge serves to strengthen faith.

Al-Ghazālī emphasized that genuine culture is impossible without moral purification and inner discipline, and that all forms of art and science should lead the human being toward the awareness of ultimate truth. In his teaching, culture acquires an ascetic-ethical dimension and becomes a path of spiritual self-perfection.

Within Muslim civilization, a highly developed urban and educational culture emerged: madrasas, libraries, and "Houses of Wisdom" contributed to the preservation and reinterpretation of the ancient philosophical heritage. Thus, the Muslim philosophical tradition made a significant contribution to the development of world culture by combining religious values with rational knowledge of the world.

"Man creates culture by striving to transcend his own nature"
Giovanni Pico della Mirandola, *On the Dignity of Man*

2.4. *The Renaissance (15th–16th Centuries*)

The Renaissance marked a qualitative turning point in the understanding of culture, associated with a renewed engagement with classical antiquity and a reassessment of the role of the human being in the world.

In contrast to the medieval worldview, oriented toward religious asceticism and submission to divine order, Renaissance culture affirmed the value of earthly life and the creative potential of the individual.

The central concept of this period was humanism, within whose framework the human being was regarded as the center of the universe, endowed with free will, reason, and the capacity for self-perfection. Culture was understood as the result of active creative human activity aimed at transforming both the external world and human nature itself. In this context, the idea of human dignity and the right to intellectual and artistic freedom was affirmed.

A vivid embodiment of the humanistic understanding of culture can be found in the works of Leonardo da Vinci and Michelangelo, in which art and science appear as the highest forms of the manifestation of human nature. The universality of the individual, combining artistic imagination and scientific inquiry, was regarded as the ideal of cultural development. Renaissance art strove for harmony, proportionality, and realism, reflecting faith in reason and the creative powers of humankind.

A distinct approach to the understanding of culture is presented in the works of Niccolò Machiavelli, who considered cultural processes in the context of politics and power. For him, culture became an instrument for the formation of civic virtues, political consciousness, and the stability of the state. Thus, during the Renaissance, culture acquired a secular character and came to be viewed as an autonomous sphere of human activity, not reducible solely to religious foundations.

"Culture is the struggle of reason against barbarism."
Immanuel Kant, *Critique of Pure Reason*

2.5. The Modern Period (17th–18th Centuries)

In the modern period, especially during the Enlightenment, culture began to be understood as an expression of human reason, scientific knowledge, and social progress. The philosophical thought of this era was directed toward liberating the human being from prejudice and the authority of tradition, which contributed to the formation of a rationalist understanding of culture as a means of perfecting both the individual and society as a whole.

One of the key representatives of rationalism was René Descartes, for whom culture appeared as the embodiment of rational thinking and methodological doubt. In his philosophy, reason was regarded as a universal instrument of cognition capable of leading the human being to truth. Accordingly, cultural development was associated with the dissemination of scientific knowledge, education, and the formation of critical thinking.

A special place in the philosophy of culture of the modern period is occupied by the teaching of Immanuel Kant. He viewed culture as a form of realizing the moral law within the human being and as a process of cultivating the capacity to act in accordance with the principles of reason and moral duty. For Kant, culture was not limited to scientific and artistic achievements but also included the development of moral autonomy of the individual, which made it a fundamental condition for genuine progress.

At the same time, a critical attitude toward culture was expressed in the works of **Jean-Jacques Rousseau**, who pointed to the contradictory nature of cultural development. In his view, civilization and cultural forms often lead to the loss of humanity's natural harmony with nature, giving rise to social inequality and moral alienation. Thus, in the philosophy of the modern period, culture was understood simultaneously as a source of progress and as a factor capable of introducing disharmony into human nature.

"Culture is a form of overcoming chaos through the creation of structure"
Georg Wilhelm Friedrich Hegel, *Phenomenology of Spirit*

2.6. *The Nineteenth Century (Classical Philosophy of Culture*)

In the nineteenth century, philosophy developed a systematic and historically oriented approach to the understanding of culture. Culture began to be viewed not as a collection of disparate manifestations of human activity, but as an integral process unfolding over time and governed by internal laws. Philosophical attention focused on identifying the structural foundations of culture and its connection with the historical development of society.

A central place in the classical philosophy of culture is occupied by the teaching of **Georg Wilhelm Friedrich Hegel**, who regarded culture as a process of the development of the World Spirit realized through dialectics. In his conception, cultural forms—religion, art, philosophy, law, and the state—appear as stages of the self-unfolding of spirit, through which primordial chaos is overcome and a rational structure of historical reality is established. Thus, culture in Hegel's philosophy acquires a universal and objective character, reflecting the movement of reason in history.

A materialist reinterpretation of culture was proposed by **Karl Marx**, who viewed it as a superstructure built upon the economic base of society, which includes relations of production. According to Marxist theory, cultural forms—ideology, morality, art, and philosophy—are conditioned by socio-economic circumstances

and reflect the interests of the ruling classes. In this context, culture appears both as a product of social practice and as a means of reproducing existing social structures.

A radically different perspective on culture is presented in the philosophy of **Friedrich Nietzsche**, for whom culture was an expression of the will to power and the human drive toward self-overcoming. Nietzsche criticized traditional cultural values, regarding them as manifestations of decline and the suppression of vital energy. Genuine culture, in his view, arises from the creative act of a strong individual capable of transcending established norms and creating new values. Thus, culture was conceptualized as a dynamic and conflict-ridden process linked to individual creativity and the revaluation of values.

"Culture is the language of the collective unconscious"
Claude Lévi-Strauss, *Structural Anthropology*

2.7. *The Twentieth Century (Non-Classical Conceptions of Culture*)

In the twentieth century, philosophical reflection on culture underwent significant transformations associated with the crisis of classical rationalism and the revision of ideas about progress and the universal foundations of human activity. Culture began to be examined through the lens of structural, semiotic, and anthropological theories, which emphasized hidden mechanisms of meaning-making, symbolic forms, and the existential experience of the human being.

A major influence on the understanding of culture was exerted by the psychoanalytic theory of **Sigmund Freud**, within which culture was interpreted as a mechanism for the repression and sublimation of human drives. Freud viewed cultural norms and prohibitions as a necessary condition for the existence of society, while emphasizing that they inevitably come into conflict with human instincts, generating inner tension and a sense of dissatisfaction.

In the structural anthropology of **Claude Lévi-Strauss**, culture appears as a system of signs and symbols organized according to specific structural principles analogous to those of language. He interpreted myths, rituals, and social practices as forms of collective thinking that reflect universal structures of human consciousness. In this context, culture was understood as a special "language" of the collective unconscious through which society interprets reality and transmits meanings from generation to generation.

An existential-ontological understanding of culture is presented in the philosophy of **Martin Heidegger**, for whom culture was a mode of human being-in-the-world. He regarded cultural forms not as external products of human activity, but as ways of disclosing the meaning of Being, through which the human being becomes aware of existence, temporality, and finitude. Thus, culture acquires a deeply personal and ontological dimension.

A historical-philosophical approach to culture was developed by **Oswald Spengler**, who viewed culture as a closed cycle of the birth, flourishing, and decline of civilizations. Rejecting the idea of linear progress, he argued that each culture possesses its own "soul" and a unique destiny, passing through inevitable stages of development and degeneration. In this context, culture is understood as an organic and temporally limited process.

"Culture becomes a space of symbolic games"
Pierre Bourdieu, *Distinction*

2.8. *The Post-Non-Classical Approach (Second Half of the 20th Century – Early 21st Century*)

Post-non-classical philosophy of culture emerged in the second half of the twentieth century and reflects profound transformations associated with globalization, the development of information technologies, and the intensification of cultural pluralism. Under conditions of fragmented social identities and the erosion of universal value foundations, culture began to be viewed as a dynamic, multilayered, and open space of meanings in which diverse discourses and practices coexist and interact.

A substantial contribution to the post-non-classical understanding of culture was made by **Michel Foucault**, who analyzed it as a system of power and domination realized through knowledge, norms, and discursive practices. In his conception, culture does not function as a neutral sphere of creativity but as a mechanism of subject formation through which society regulates individual behavior and reproduces structures of power. Thus, cultural forms are closely linked to processes of control and discipline.

A radical rethinking of cultural reality is presented in the philosophy of **Jean Baudrillard**, who viewed culture as a system of simulacra and virtual images. In the conditions of mass media and digital technologies, signs, in his view, lose their connection with reality and begin to reproduce one another, creating hyperreality. In this context, culture turns into an autonomous sphere of symbolic consumption, where the boundaries between the authentic and the artificial become blurred.

The sociological dimension of post-non-classical philosophy of culture is represented in the works of **Pierre Bourdieu**, who viewed culture as a field of social interactions and symbolic games. He introduced the

concept of **symbolic capital**, emphasizing that cultural practices are connected with struggles for social recognition and power. Culture thus appears not only as a form of self-expression but also as an instrument of social inequality and the reproduction of status distinctions.

Overall, the post-non-classical approach is characterized by a rejection of universal and hierarchical models of culture and by the affirmation of its pluralistic, processual, and contextual nature. Culture is understood as an open space of interpretations in which power, symbols, technologies, and individual experience intersect.

"Contemporary culture is a space where incompatible meanings coexist"

Jean-François Lyotard

3. The Current State of Culture

The contemporary state of culture is defined by high dynamism and a multiplicity of forms, which is associated with the acceleration of social change, the development of technologies, and the intensification of global interconnectedness. Today, culture functions not only as a system of values and norms but also as a constantly changing space of meanings, images, and practices, in which traditional forms coexist with new—digital and network-based—ones. Under these conditions, several key trends can be identified that shape the content of culture and the ways in which it functions.

Cultural Globalization: Homogenization and the Loss of Local Identity

Cultural globalization refers to the expansion of cultural contacts and the mutual penetration of traditions, lifestyles, patterns of consumption, and values across different regions of the world. On the one hand, this process leads to cultural integration: people gain access to ideas, music, cinema, literature, and educational practices from different countries. On the other hand, globalization often produces cultural homogenization—the strengthening of uniform standards of mass culture—which can displace local forms and weaken regional identities.

Example: international brands, standardized entertainment formats, and the spread of similar musical trends and visual styles on social media create a "universal" cultural background. At the same time, local traditions (language, rituals, everyday practices, national forms of art) may become folkloric "symbols," losing their living connection with everyday life.

In this context, different types of culture can be distinguished:

- ***Global (world) culture*** — cultural products and values shared across many countries (for example, global cinema, English-language pop music, international digital communication).
- ***Local (regional) culture*** — traditions and norms specific to a particular people, city, or region (for example, national holidays, cuisine, family structures, local artistic schools).

The Information Society: Culture as a Flow of Data and Images

The information society transforms the nature of cultural experience: culture is increasingly perceived as a flow of information rather than as a stable set of traditions. In the digital environment, cultural forms acquire an accelerated and "fragmentary" character: individuals encounter vast streams of symbols, news, memes, videos, and texts that rapidly replace one another.

Extended definition: the culture of the information society is a cultural environment in which information and communication become the main resources, while digital media and networks serve as the primary channels. Importance is attributed not only to works of art or philosophical ideas but also to modes of distribution—algorithms, platforms, and media trends.

Examples:

- "Recommendation culture," in which music and video platforms shape taste through algorithms.
- The transformation of reading: short formats, posts, and visual narratives displace sustained immersion.
- The emergence of new genres: podcasts, streaming, interactive media, and blogger culture.

Within this logic, **symbolic culture** (language, signs, visual codes) becomes increasingly dominant, since sign systems become the primary means of cultural exchange.

Postmodernism: The Rejection of the Idea of Universal Culture

In the postmodern context, culture is interpreted as a space of multiple interpretations in which no single "center" or universal normative scale exists. Postmodernism in cultural philosophy implies skepticism toward universal foundations (a single truth, linear progress, or a fixed "canon") and recognition of the equality of diverse styles and forms.

Example: contemporary art often relies on quotation, genre mixing, irony, and playful engagement with existing cultural forms. Classical and mass forms may be combined—opera and rap, museum aesthetics and internet memes, high literature and fan fiction.

This shift leads to an important rethinking of cultural types:

- ***Elite (high) culture*** — professional art and canonical forms requiring special preparation for understanding (classical music, philosophical texts, academic art).
- ***Mass culture*** — cultural products oriented toward broad audiences and mass reproduction (pop music, television series, entertainment formats).
- ***Popular culture*** (often overlapping with mass culture) — everyday and media-based practices, including fan communities, bloggers, and trends.

In postmodernity, the boundaries between these levels become blurred: "high" culture can become mass, while mass culture penetrates artistic practices.

Cultural Pluralism: A Multiplicity of Cultural Codes

Cultural pluralism refers to the coexistence of multiple cultural norms and codes within a single society or even within an individual's life-world. Contemporary individuals are often simultaneously embedded in different cultural environments: family traditions, global communication standards, professional communities, youth subcultures, and digital groups.

Extended definition: a **cultural code** is a set of symbols, values, norms, and behavioral patterns through which a group interprets the world and expresses its identity. Pluralism emerges when multiple codes coexist without being reducible to a single model.

Examples:

- The coexistence of religious and secular cultures within the same city.
- Different behavioral models in family life, professional settings, and online environments.
- Multilingualism and the blending of traditions in migratory contexts.

Cultural pluralism is closely linked to the phenomenon of subcultures:

- ***Subculture*** — a cultural system within society distinguished by specific styles, values, and language (for example, musical, youth, or professional communities).
- ***Counterculture*** — a form of subculture that consciously opposes dominant values and norms (historically, radical youth movements and protest cultural forms).

The Technologization of Culture: Virtual Environments, Digital Technologies, and Media

The technologization of culture means that technology becomes not merely a tool for disseminating culture but its internal environment and condition of existence. Digital platforms transform the ways cultural forms are created, consumed, and preserved. **Digital culture** emerges, in which virtual spaces, media images, and networked communication play a decisive role.

Examples:

- Virtual communities and identities (avatars, online "selves," digital reputations).
- Media culture: the influence of news feeds, visual content, and short videos.
- Networked creativity: memes, remixes, digital art, and user-generated content.

Within this context, several distinct types can be identified:

- ***Media culture*** — culture shaped by mass and digital media, in which reality is often perceived through screen-based images.
- ***Virtual culture*** — cultural practices existing primarily in online environments (online communication rituals, networked communities, digital leisure).
- ***Consumer culture*** — an orientation toward the symbolic value of objects, brands, and lifestyles, in which things function as signs of status and identity.

Contemporary culture thus represents a multilayered system in which global processes interact with local traditions, digital technologies reshape communication and creativity, and the multiplicity of cultural codes becomes the norm. Culture does not disappear or become simplified; rather, it becomes more fragmented, flexible, and dependent on information flows, symbolic games, and media mechanisms.

4. Forecasts for the Development of Culture in the 21st Century

The development of culture in the twenty-first century is taking place under conditions of rapid technological progress, digitalization, and the transformation of forms of human experience. As **Michel Foucault** notes, "the future of culture is a struggle for control over the production of knowledge and meaning" (Foucault, *The Will to Truth*, p. 132), which highlights the growing role of informational and symbolic mechanisms in shaping cultural reality.

This makes it possible to speak not only of new tendencies, but also of qualitatively new models of cultural development, in which technologies become equal participants in cultural processes.

"We shape our tools, and thereafter they shape us"

Marshall McLuhan

1. *The Culture of Hybrid Forms*

The culture of hybrid forms implies the integration of real and virtual experience within a unified space of human perception. The boundaries between physical reality and digital environments are gradually being blurred due to the development of virtual reality (VR), augmented reality (AR), and neural network systems.

Definition: the culture of hybrid forms is a type of culture in which cultural experience is formed simultaneously in material and digital environments, creating new modes of interaction with art, knowledge, and social reality.

Examples:

- virtual museums and exhibitions that allow people to "visit" cultural spaces without physical presence;
- concerts and performances in metaverses;
- the use of neural networks to create interactive artistic objects;
- blended educational formats in which digital environments complement face-to-face interaction.

Within this trend, culture ceases to be strictly tied to place and to the bodily presence of the individual.

2. *The Dominance of Information Culture*

Information culture is becoming the leading form of cultural production and consumption. Under conditions of digital platforms, social networks, and global media, cultural meanings circulate in the form of data, images, and codes that are constantly reproduced and transformed.

Definition: information culture is a cultural system in which information functions as the primary resource, and the speed of its production, dissemination, and interpretation becomes a key factor in cultural development.

Examples:

- fragmented ("clip-like") thinking and short communication formats;
- memes as a form of mass symbolic creativity;
- algorithmic shaping of tastes and preferences;
- the culture of likes, reposts, and visual self-presentation.

The dominance of information culture leads to the fragmentation of meanings and to the strengthening of the role of media as an intermediary between the individual and reality.

"The key question of the future is not what machines will be able to do,
but what will remain for human beings to do"
Yuval Noah Harari

3. *Artificial Intelligence as a Cultural Agent*

One of the most radical tendencies of the twenty-first century is the transformation of artificial intelligence into an independent participant in cultural processes. AI increasingly functions not only as a tool but also as a cultural agent capable of creating original works of art, music, and literature.

Definition: a **cultural agent** is a subject or system capable of participating in the creation, transmission, and transformation of cultural meanings.

Examples:

- the generation of musical compositions and visual artworks by neural networks;
- algorithmic authorship of texts and screenplays;
- interactive works that adapt to the viewer's response;
- digital characters and virtual authors.

This challenges the traditional understanding of creativity as an exclusively human capacity.

"Technical objects evolve together with human beings and form new modes of thinking"
Gilbert Simondon

4. *The Culture of Symbiosis*

The culture of symbiosis implies the merging of the human and the technological, leading to the formation of a new cognitive culture. Technologies become not external tools but integral components of human thinking, memory, and communication.

Definition: the culture of symbiosis is a form of culture arising from the integration of biological and technological components of human experience.

Examples:

- the use of neural interfaces and extended memory systems;
- the constant presence of digital assistants in everyday life;
- collective thinking through network platforms;
- the "extended mind" relying on external computational systems.

In such a culture, the very notion of the subject is transformed: the human being becomes a hybrid entity combining biological and digital dimensions.

5. *The Ethics of Technological Culture*

Technological development inevitably raises ethical questions concerning the limits of intervention in human nature and the status of artificial intelligence. The ethics of technological culture thus becomes a central area of philosophical and social reflection on the future of culture.

Definition: the ethics of technological culture is a field of philosophical analysis that examines the moral consequences of technological development and its impact on human values, freedom, and identity.

Key issues and examples:

- the question of AI rights and responsibility;
- acceptable limits of modification of the human body and consciousness;
- the preservation of human autonomy under conditions of algorithmic governance;
- the problem of cultural inequality related to access to technologies.

Thus, the future of culture in the twenty-first century is determined not only by technological progress, but also by society's ability to comprehend and ethically regulate new forms of cultural existence.

"The future belongs to those who can unite biological intelligence with artificial intelligence without losing human meaning"

Yuval Noah Harari

Conclusion

The conducted analysis of the historical and philosophical development of culture allows us to conclude that throughout the history of humanity, culture has functioned not as a static phenomenon but as a dynamic system reflecting ways of human self-understanding and forms of interaction with the world. From the ancient interpretation of culture as the cultivation of reason and harmony, through the medieval understanding of culture as service to God, the humanistic ideals of the Renaissance, and the rationalism of the modern era, philosophical thought has gradually come to conceive of culture as a complex, multilayered, and historically mutable process.

In the nineteenth century, culture was conceptualized within systemic and historical frameworks, in which it was viewed as a form of the self-development of spirit, a reflection of socio-economic conditions, or an expression of the will to overcome. In the twentieth century, a radical shift occurred toward non-classical and post-non-classical understandings of culture, in which the emphasis moved from universal models to structures, symbols, discourses, power relations, and unconscious mechanisms. Culture began to be interpreted as a space of meanings, conflicts, interpretations, and symbolic games.

The contemporary state of culture is characterized by globalization, technologization, and cultural pluralism. Culture increasingly manifests itself in the form of information flows, media images, and digital practices, while traditional boundaries between elite, mass, and local cultures become blurred. Individuals find themselves simultaneously embedded in multiple cultural contexts, which requires cognitive flexibility and the capacity for intercultural interpretation.

Of particular importance is the forecasting of cultural development in the twenty-first century. The historical and philosophical evolution of culture demonstrates a movement from sacred and rational forms toward complex, symbiotic models. The twenty-first century will witness the emergence of a new culture—the culture of hybrid intelligence—in which human beings and artificial intelligence will function not as opposing entities, but as co-authors and participants in a global cultural process. Artificial intelligence is gradually becoming a cultural agent capable of participating in the creation of meanings, artistic forms, and cognitive practices.

"The main challenge of the twenty-first century is to preserve human meaning within the union of biological and artificial intelligence". (Harari, Y. N., *Homo Deus*, 2019, p. 386).

Under these conditions, the key challenge lies not so much in technological development as in the ethical and philosophical reflection on its consequences. Questions arise concerning the limits of intervention in human nature, responsibility for the actions of intelligent systems, the preservation of personal autonomy, and the safeguarding of humanistic values. The future of culture will largely depend on society's ability to develop new ethical norms and forms of cultural regulation appropriate to the conditions of digital and hybrid reality.

Conclusions

1. Culture represents a historically variable system of values, meanings, and forms of activity that reflects modes of human self-understanding.
2. Philosophical interpretations of culture evolve from sacred and rational models toward non-classical and post-non-classical approaches.
3. Contemporary culture is characterized by pluralism, mediatization, and technological conditioning.
4. The twenty-first century creates the conditions for the emergence of a hybrid culture based on the interaction between human and artificial intelligence.
5. The ethics of technological culture becomes a central problem of the philosophy of the future.

Recommendations

• In further philosophical analyses of culture, special attention should be given to interdisciplinary research integrating philosophy, cultural studies, sociology, and cognitive sciences.

• Under conditions of digitalization, it is essential to develop critical thinking and cultural reflection as foundations for preserving human autonomy.

• A promising area of research is the analysis of artificial intelligence as a new subject of cultural production.

• In educational and cultural practices, it is important to maintain a balance between technological development and humanistic values.

Bibliography

1. Cicero, M. T. *Tusculan Disputations*. Moscow: Nauka, 1975.
2. Augustine of Hippo. *The City of God*. Moscow: Mysl, 1998.
3. Thomas Aquinas. *Summa Theologica*. Moscow: Eksmo, 2010.
4. Al-Ghazālī. *The Revival of the Religious Sciences*. Moscow: Vostochnaya Literatura, 1980.
5. Pico della Mirandola, G. *On the Dignity of Man*. Moscow: Mysl, 1981.
6. Kant, I. *Critique of Pure Reason*. Moscow: Mysl, 1994.
7. Hegel, G. W. F. *Phenomenology of Spirit*. Moscow: Nauka, 1992.
8. Marx, K. *A Contribution to the Critique of Political Economy*. Moscow: Politizdat, 1974.
9. Nietzsche, F. *Thus Spoke Zarathustra*. Moscow: Azbuka, 2015.
10. Lévi-Strauss, C. *Structural Anthropology*. Moscow: Akademicheskii Proekt, 2001.
11. Heidegger, M. *Being and Time*. Moscow: Ad Marginem, 1997.
12. Spengler, O. *The Decline of the West*. Moscow: Mysl, 1993.
13. Bourdieu, P. *Distinction*. Moscow: Ad Marginem, 2005.
14. Baudrillard, J. *Simulacra and Simulation*. Moscow: Postum, 2015.
15. Foucault, M. *The Will to Truth*. Moscow: Magistr, 1996.
16. McLuhan, M. *Understanding Media*. Moscow: Kanon-press-Ts, 2003.
17. Simondon, G. *On the Mode of Existence of Technical Objects*. Moscow: Ad Marginem Press, 2018.
18. Harari, Y. N. *Homo Deus: A Brief History of Tomorrow*. Moscow: Sindbad, 2019.

Physical sciences

FROM THE CORRECTED VERSION OF THE SRT IT FOLLOWS THAT TIME TRAVELS FOR PEOPLE ON EARTH IS PHYSICALLY POSSIBLE AND TECHNICALLY FEASIBLE[1]

Antonov Alexander Alexandrovich

Abstract

The article explains that it will probably soon be possible to travel through time on Earth.. And such a possibility is created by the corrected version of the special theory of relativity (SRT). But the version of SRT studied in all physics textbooks states that time travel on Earth will never be available to people. Nevertheless, ignoring this opinion of the generally recognized service station, currently millions of air passengers already travel through time every day, which is confirmed by the translation of their watches to local time after landing the plane.

Keywords: special relativity theory, relativistic formulas, Multiverse, anti-universe, antimatter, anti-time, internal time, external time, time zones of Earth, time travels

1. Preface

The author published his three "top secret" articles in which the physical reality of imaginary numbers was proved, during the existence of the USSR. And after this, the Library of the US Congress contacted the author's place of work with a request to send an unclassified his publications. And at this time the author, having learned about the secret resolution of the Presidium of the USSR Academy of Sciences 1964 prohibiting any criticism of the works of Albert Einstein, not wanting to be repressed, stopped his research and left the Moscow region for Ukraine. And he resumed his research only after the collapse of the USSR, as a result of which Ukraine became independent. Later, already living in Ukraine, the author in 2008-2010. published five unclassified articles in English, in which he also proved the physical reality of imaginary numbers. And thus, with his publications, he made the unsuccessful ORERA experiment in 2011 unnecessary. However, participants in the ORERA experiment ignored these publications. And the incorrect version of the SRT still continues to be studied in all physics textbooks. And these textbooks are used in the educational process of universities, even the most prestigious ones.

2. Introduction

The article explains that the special theory of relativity (SRT), studied in all physics textbooks, rightly recognized as an outstanding scientific achievement due to the principle of relativism proposed in it, nevertheless, due to the lack of necessary experimental knowledge in the 20th century, turned out to be largely incorrect[2]. Therefore, she could not explain the phenomena of dark matter and dark energy, the problem of baryon asymmetry, denied the existence of tachyons and antimatter, and incorrectly solved other problems of astrophysics. And due to the inability to explain the relativistic formulas obtained by the creators of this theory in the hyperluminal speed range, the incorrect principle of not exceeding the speed of light was introduced into the SRT, from which incorrect conclusions were drawn about the existence in nature of our only visible universe and about the physical unreality of imaginary numbers. But by denying the physical reality of imaginary numbers, this incorrect SRT denied the existence of radio technology and computer technology, resonance and bell ringing, tsunamis, piano music, swaying children's swings and much more. Therefore, due to the complete lack of experimental proof of its truth of this version of SRT, Albert Einstein for its creation, even despite the fact that he was nominated for the Nobel Prize 66 times, never received it.

This incorrect version of the theory of relativity also denies the possibility of time travel for humans. But every day, millions of airplane passengers on Earth make such time travel that they don't need. And this article explains how to make time travel necessary and beneficial for people on Earth.

3. The version of SRT taught in all physics textbooks is incorrect

However, while being brilliant in its concept, the version of SRT taught in all physics textbooks is nevertheless largely incorrect, since::

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[1] *This is reprint of the article "Antonov A. A. 2026. How to call yourself to yesterday? Norwegian Journal of Development of the International Science No 172".*

[2] *For a new theory, this is forgivable. But then it still needs to be corrected.*

- the relativistic formulas obtained in this SRT are incorrect, because it is ignored the fact that the argument 'velocity' in them, in accordance with Newton's first law, is the fourth spatial dimension[3] [1]-[5];
- the formula for the relativistic mass m(v) in the hyperluminal $v > c$ speed range corresponds to a physically unstable process that cannot exist in nature;
- being unable to explain the physical meaning of the imaginary values of the quantities *m(v), (v), l(v)* in the hyperluminal $v > c$ speed range, the authors of the SRT, in order not to explain their relativistic formulas in this range, introduced an incorrect postulate into it, called the principle of not exceeding the speed of light, which is incompatible with the fourth spatial dimension.
- in the 21st century, despite the fact that the attempt to refute SRT with the OPERA experiment [6] at the Large Hadron Collider was unsuccessful, it was still experimentally proven that imaginary numbers are physically real [7]-[24]. And, therefore, the principle of not exceeding the speed of light in the generally accepted SRT and this version of SRT itself, which is studied in textbooks, are incorrect [25]-[57].

In addition, the conclusions drawn from incorrect relativistic formulas using the incorrect principle of not exceeding the speed of light are also incorrect:

- about the existence in nature of our only visible universe;
- about the physical unreality of imaginary numbers.

4. Proof of the physical reality of imaginary numbers

But by now, numerous [7]-[24] experimental evidence of the physical reality of imaginary numbers have already been published. All of them are quite simple and can be completed by one radio engineer in less than one day. They can therefore always be repeated and checked in any other radio engineering laboratory. In contrast to these simple radio engineering experiments, the unsuccessful OPERA physics experiment at the Large Hadron Collider was carried out for a total of almost 15 years (2003-2018).

And so that the reader can convince himself of the truth of the mentioned radio enginee-ring experiments, let us consider one of them as an example. The rest are also quite simple expe-rimenta mentioned in the list of references.

From the well-known Ohm's law in the interpretation of Steinmetz [58], the validity of which is daily confirmed by millions of radio engineers throughout the world through their practical activities, it follows that in addition to the electrical resistance R of resistors, measured by real numbers, there are also electrical resistances $-j/\omega C$ of capacitors and $+j\omega L$ of inductors, which are measured by imaginary numbers.

Consequently, if these imaginary numbers $-j/\omega C$ and $+j\omega L$, in accordance with the generally accepted version of SRT are physically unreal, then the electrical resistance of any electrical *LCR*-circuit will always be measured in real numbers and will not depend on frequency. Therefore, when the frequency ω of the applied voltage changes, the amount of current flowing through such an electrical circuit will not change.

And vice versa, if the imaginary resistances $-j/\omega C$ and $+j\omega L$ are physically real, then the electrical resistance of any electrical *LCR*-circuit will be measured in complex numbers and when the frequency ω of the applied voltage changes, its resistance will change. Therefore, in accordance with Ohm's law, the magnitude of the current flowing through this electrical *LCR*- circuit will also change.

Consequently, an experiment proving the physical reality of imaginary numbers is extremely simple. You just need to change the frequency ω of the voltage applied to any electrical *LCR*-circuit and measure the valueof electric current flowing through it. And all radio engineers know that in this case its value will change. Thus proving the physical reality of imaginary numbers.

However physicists did not do such an experiment, since in fact, as shown below, on the contrary, they need evidence of the physical unreality of imaginary numbers. Which do not exist in nature.

5. Corrected version of SRT

And since the physical reality of imaginary numbers has just been proven in the most indisputable way, it remains to fully and correctly explain (which no one has done over the past hundred years) the relativistic formulas of SRT [59]-[67].

$$m = \frac{m_0}{\sqrt{1-(v/c)^2}} \quad (1)$$

$$\Delta t = \Delta t_0 \sqrt{1-(v/c)^2} \quad (2)$$

[3] *Not to be confused with the fourth dimension in four-dimensional space-time (Minkowski space).*

$$l = l_0\sqrt{1-\left(v/c\right)^2} \quad (3)$$

in which m_0 is the rest mass of a moving body;

m is the relativistic mass of a moving body;

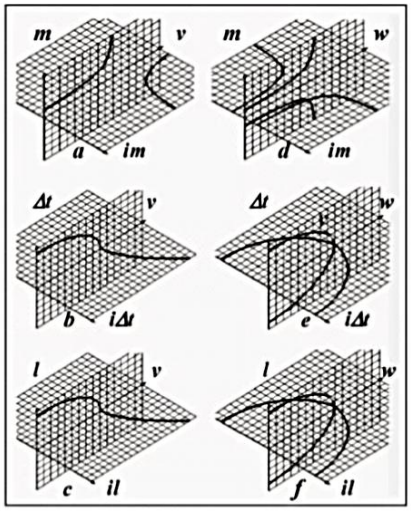

Fig 1. *Graphs of functions m(v), Δt(v), l(v), corresponding to the existing and revised versions of SRT in the subluminal v < c and hyperluminal v > c ranges*

m is the relativistic mass of a moving body;

Δt_0 is the rest time of a moving body;

Δt is the relativistic time of a moving body;

l_0 is the rest length of a moving body;

l is the relativistic length of a moving body.

These formulas correspond to the graphs in Fig. 1a,b,c. And they show that these graphs in the subluminal $v < c$ and hyperluminal $v > c$ ranges of the argument v have different appearances. Therefore, the same processes cannot occur in these ranges. And in order for the same processes to occur in these ranges, the graphs of the corrected relativistic formulas should look the same, as shown in Fig. 1d,e,f. And for this, in formulas (1)-(3), since the speed v in them is the fourth spatial dimension, the factor[4] i^q must be introduced

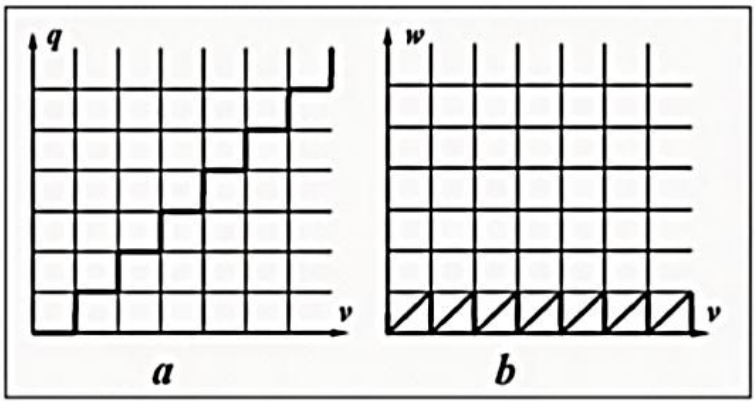

Fig. 2. *Graphs of functions q(v) and w(v), illustrating the meaning of the "floor" function of discrete mathematics*

[4] *In the theory of functions of a complex variable, the function iq is defined only for integer values of the argument q. However, it can be further defined as follows. For integer values of the argument ...–2,–1, 0,+1,+2,+3,+4,+5,... the function iq is equal to ...–1,–i,+1,+i,–1,–i,+1,+i,... But for the same integer values of the argument ...–2, –1, 0,+1,+2,+3,+4,+5,... to the same values ...–1,–i,+1,+i,–1,–i,+1,+i,... is also equal to the function eiqπ/2, which, in accordance with Euler's formula eiqπ/2 = cos(qπ/2)+isin(qπ/2), is also defined for non-integer values of the argument q. Therefore, the function iq can be further defined for any values of the argument q by the formula iq = cos(qπ/2)+isin(qπ/2), similar to Euler's formula. The resulting formula allows you to determine the value of the function iq for any, including non-integer, values of the argument q. And it will be needed in astro-geophysical studies of portals, which will be discussed further.*

$$m(q) = \frac{m_0 i^q}{\sqrt{1-(v/c - q)^2}} = \frac{m_0 i^q}{\sqrt{1-(w/c)^2}} \quad (4)$$

$$\Delta t(q) = \Delta t_0 i^q \sqrt{1-(v/c - q)^2} = \Delta t_0 i^q \sqrt{1-(w/c)^2} \quad (5)$$

$$l(q) = l_0 i^q \sqrt{1-(v/c - q)^2} = l_0 i^q \sqrt{1-(w/c)^2} \quad (6)$$

where $q(v) = \lfloor v_q/c \rfloor$ is the "floor" function of discrete mathematics from the argument v_q/c (its graph shown in Fig. 2a), which is the fourth spatial dimension;

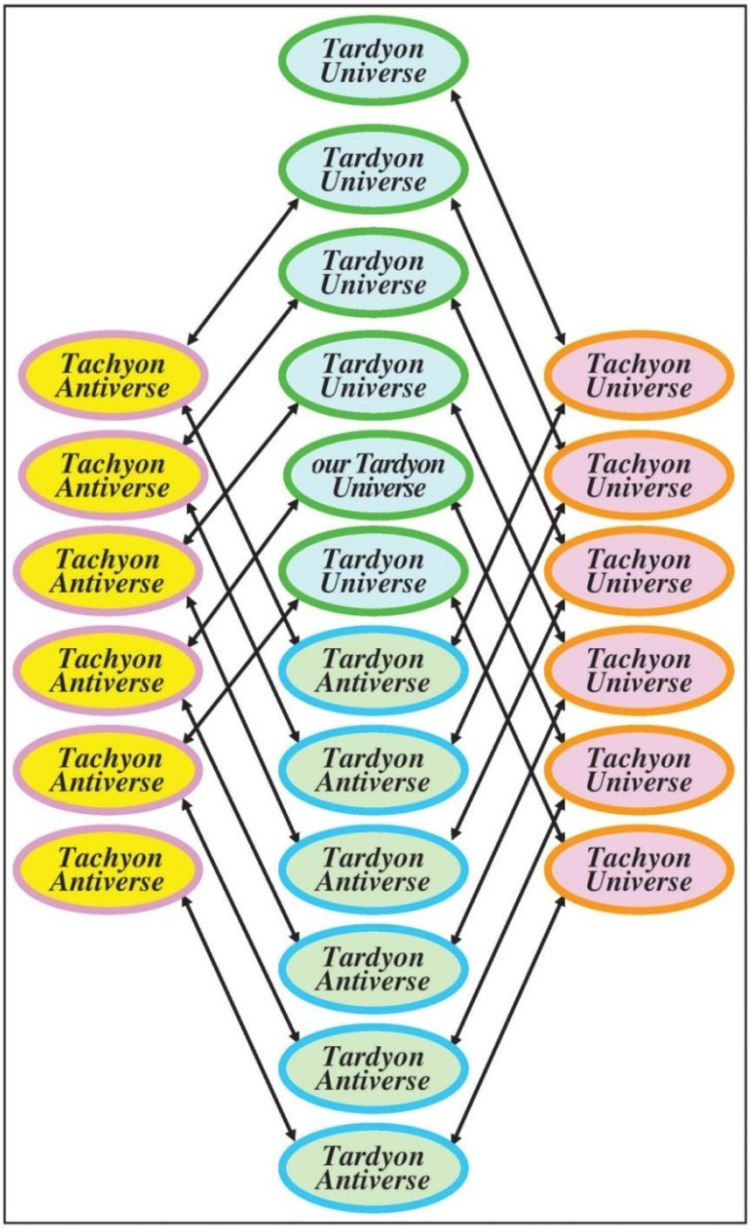

Fig. 3. *Structure of the hidden Multiverse corresponding to the principle of physical reality of complex numbers*

$w = v - qc$ – is the local speed in all universes (its graph is shown in Fig. 2b).

At that, this function iq in formulas (4)-(6), which determines the essence of each universe, for integer values of the argument *q(v)* equal to ... *0,1,2,3,4,5,...*, takes the values *+1, +i, -1, -i, +1, +i*, ... etc. And the value *q(v) = 0*[5] in formulas (4)-(6) for the range of sublight *speeds v < c* corresponds (since $i^0 = 1$) to our

[5] *Those. if we take our visible universe as the origin of coordinates q.*

visible universe, which for definiteness we will call the tardyon universe[6] (see Fig. 3). The value $q(v) = 1$ in the hyperluminal speed range $2c > v > c$ corresponds (since $i^1 = i$) to some other invisible universe, since it is located beyond the event horizon. For definiteness, we will therefore call it the tachyon universe[7]. Then the value $q(v) = 2$ in the speed range $3c > v > 2c$ will correspond (since $i^2 = -1$) to an invisible tardion antiverse. The value $q(v) = 3$, in the speed range $4c > v > 3c$ will correspond (since $i^3 = -i$) to an invisible tachyon antiuniverse. The value $q(v) = 4$ in the speed range $5c > v > 4c$ will correspond (since $i^4 = +1$) to another (and therefore also invisible) tardyon universe. The value $q(v) = 5$ in the speed range $6c > v > 5c$ will correspond (since $i^5 = +i$)) to another tachyon universe. Etc.

Consequently, in nature there is not only, as stated in the generally accepted version of SRT, our visible universe corresponding to formulas (1)-(3), but also many other mutually invisible[8] universes and antiuniverses corresponding to formulas (4)-(6). And these mutually invisible universes and antiuniverses, together with our visible universe, form the Multiverse, which we therefore called hidden. Such a hidden Multiverse, the structure of which is helical, is shown in Fig. 3.

6. The invisible universes and anti-universes of the hidden Multiverse are dark matter and dark energy

However, in this structure it is still necessary to take into account and explain the phenomena of dark matter and dark energy, so named because of their incomprehensibility, since not a single chemical element has been found in them, and also because they do not emit, absorb, reflect or refract electromagnetic radiation and, therefore, are invisible. Finally, it is not clear why dark matter and dark energy, which accounts for more than 95% of all mass-energy contained in nature, are being persistently searched for at the Large Hadron Collider in the microcosm of our only visible universe. It's impossible to explain.

Therefore, let us assume that dark matter and dark energy are all other mutually invisible universes and antiuniverses of the hidden Multiverse. Then the phenomena of dark matter and dark energy will be a gravitational shadow on our visible universe from the remaining mutually invisible universes and antiuniverses included in the hidden Multiverse. That is why these phenomena do not contain, like our shadow on a sunny day, a single chemical element, and dark matter and dark energy contain more than 95% of all mass-energy contained in nature. This assumption explains all the incomprehensibility of phenomena simply and clearly. That's why we will use it.

Then, assuming that over the billions of years of its existence, the mass-energy of all universes and antiuniverses of the hidden Multiverse, due to the presence of a huge number of portals between them according to the law of communicating vessels, has been largely averaged, it becomes possible, using the data obtained by the WMAP and Planck spacecraft, to determine the structure of the hidden Multiverse. And according to data obtained by the WMAP spacecraft [68], the mass-energy of our visible universe (in fact, our hidden Multiverse) consists of 4.6% baryonic matter, 22.4% dark matter and 73.0% dark energy. And according to more recent data obtained by the Planck spacecraft [69], the mass-energy of our visible universe (again, actually our hidden Multiverse) consists of 4.9% baryonic matter, 26.8% dark matter and 68.3% dark energy. As you can see, these data differ little from each other, which proves their truth. Therefore:

• the entire hidden Multiverse, according to experimental data obtained by the WMAP spacecraft, consists of 100% / 4.6% = 21.8 parallel universes, and according to data obtained by the Planck spacecraft, it consists of 100% / 4.9% = 20.4 parallel universes;

• dark matter, according to experimental data obtained by the WMAP spacecraft, consists of 22.4% / 4.6% = 4.9 parallel universes, and according to data obtained by the Planck spacecraft, it consists of 26.8% / 4.9% = 5.5 parallel universes;

• dark energy, according to experimental data obtained by the WMAP spacecraft, consists of 73.0% / 4.6% = 15.9 parallel universes, and according to data obtained by the Planck spacecraft, it consists of 8.3% / 4.9% = 13.9 parallel universes;

• and our visible universe, naturally, is only one.

7. Corrected version of SRT (continued)

As can be seen, received by the WMAP and Planck spacecraft experimental data did not confirm the above conclusions about the structure of the hidden Multiverse, since our visible universe actually has not two neighboring invisible parallel universes - one tachyon universe and one tachyon antiuniverse - but five or six[9].

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[6] *Tardyon universe is a term used by Isaak Asimov in his short story 'Take a Match'.*
[7] *Tachyon universe is a term used by Isaak Asimov in his short story 'Take a Match'.*
[8] *Since they are all beyond the event horizon*
[9] *According to WMAP data 4.9 universes and Planck data 5.5 universes*

Consequently, there was some error in the previous reasoning. And we, it turns out, were wrong in assuming that in the hidden Multiverse there is only one additional dimension q. And therefore, when describing it, they used complex numbers containing only one imaginary unit. And now, in order for six other parallel universes to coexist with our visible universe in the really existing hidden Multiverse - three tachyon universes and three tachyon antiuniverses - it is necessary to have three additional dimensions *q, r, s.* At the same time relativistic formulas must be corrected again as follows [70]-[77]

$$m(q,r,s) = \frac{m_0 i_1^q i_2^r i_3^s}{\sqrt{1-[v/c-(q+r+s)]^2}} \quad (7)$$

$$\Delta t(q,r,s) = \Delta t_0 i_1^q i_2^r i_3^s \sqrt{1-[v/c-(q+r+s)]^2} \quad (8)$$

$$l(q,r,s) = l_0 i_1^q i_2^r i_3^s \sqrt{1-[v/c-(q+r+s)]^2} \quad (9)$$

where $q(v) = \lfloor v_q/c \rfloor$ is the "floor" function of discrete mathematics from the argument v_q/c which is one of the orthogonal coordinates *q* of the fourth spatial dimension *v*;
$r(v) = \lfloor v_r/c \rfloor$ is the "floor" function of discrete mathematics from the argument v_r/c which is another orthogonal coordinate *r* of the fourth spatial dimension *v*;
$s(v) = \lfloor v_s/c \rfloor$ is the "floor" function of discrete mathematics from the argument v_s/c which is another orthogonal coordinate *s* of the fourth spatial dimension *v*;
v_q, v_r, v_s is projections of the velocity vector *v* onto the orthogonal coordinates *q, r, s* (see Fig. 4).

The space of such a hidden Multiverse will already be six-dimensional (see Fig. 4). And its structure will correspond to the quaternions $\sigma + i_1\omega_1 + i_2\omega_2 + i_3\omega_3$, i.e. hypercomplex numbers [78] containing exactly three imaginary units i_1, i_2, i_3, which are related to each other by the relations

$$i_1^2 = i_2^2 = i_3^2 = -1 \quad (10)$$

$$i_1 i_2 i_3 = i_2 i_3 i_1 = i_3 i_1 i_2 = -1 \quad (11)$$

$$i_1 i_3 i_2 = i_2 i_1 i_3 = i_3 i_2 i_1 = 1 \quad (12)$$

In such a quaternion structure of the hidden Multiverse [79], in contrast to its structure considered earlier (in Fig. 3), the distribution of material content in each three-dimensional parallel universe will be determined by a certain function $f_{q,r,s}(x,y,z)$, and the coordinates of these universes will be determined by the values i_1q, i_2r, i_3s. Those. the hidden Multiverse (see Fig. 4) will be described by the formula $f_{q,r,s}(x,y,z) + i_1 q + i_2 r + i_3 s$. This is exactly what Lisa Randall predicted: *"Perhaps we live in a three-dimensional pocket of higher dimensional space"*.

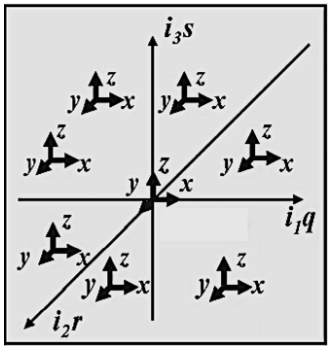

Fig. 4*. Six-dimensional space of the hidden Multiverse, where q, r, s are the coordinates of invisible parallel universes, and x, y, z are the coordinates of the matter content in each parallel universe*

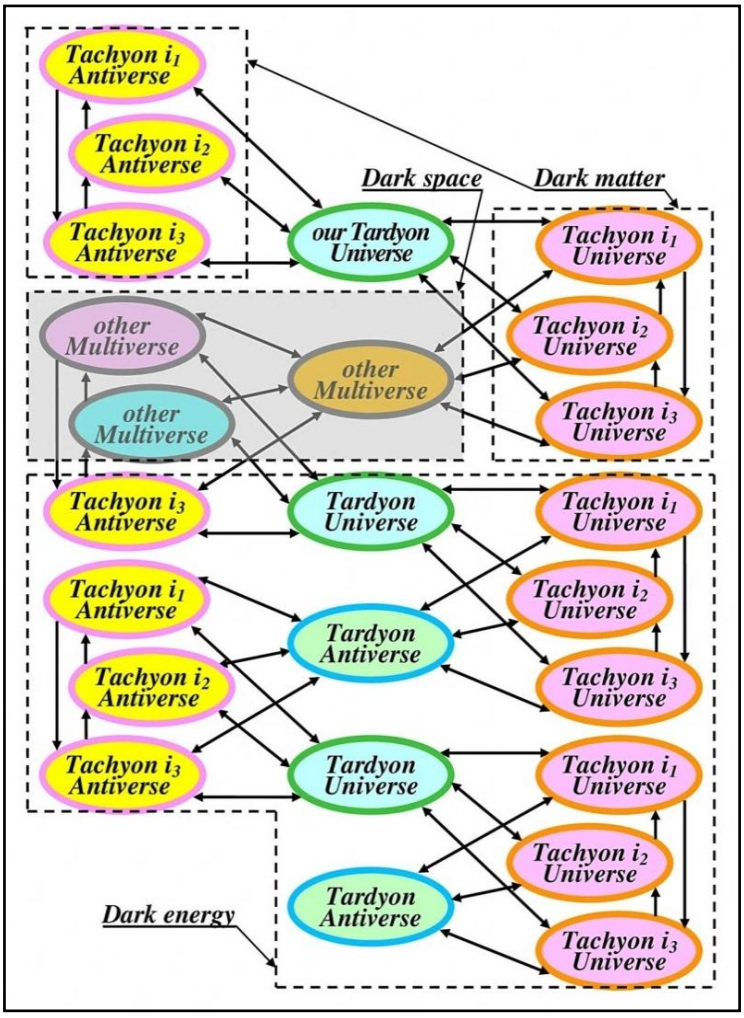

Fig. 5. *Structure of the hidden Multiverse corresponding to the principle of physical reality of hyper-complex numbers*

From formulas (7)-(9) it follows that such a hidden Multiverse still has a helical structure, and its mutually invisible universes and antiuniverses (in addition to our visible universe) form dark matter and dark energy. In this case, it is possible to move into the tardion antiuniverse from the tardion universe and into the tardion universe from the tardion antiuniverse in various, but not arbitrary, ways, but only in such a way (see Fig. 5), in which the value of i^q will successive-ly take on the values $+1$, $+ i_1 \oplus + i_2 \oplus + i_3$, -1, $- i_1 \oplus - i_2 \oplus - i_3$, +1, **…** and etc., where $\oplus$ is the symbol of the logical operation of discrete mathematics ‘exclusive OR’. In this case, different trajectories of movement from one universe (or antiuniverse) to another can differ only due to the replacement of some tachyon universes from i_1, i_2, i_3 with others and some tachyon anti-universes from i_1, i_2, i_3 with others. Consequently, tachyon universes i_1, i_2, i_3 in the hidden Multiverse are located parallel to each other. Tachyon antiuniverses i_1, i_2, i_3 are also located parallel to each other for the same reasons. And therefore, in the hidden Multiverse, when transitioning from any tardion universe to a tardion anti-universe and then to another tardion universe, parallel universes and antiverses must alternate in the following sequence - ‘tardion universe’, ‘one of the tachyon universes’, ‘tardion anti-universe’, ‘one of the tachyon anti-universes’, ‘tardion universe’, ‘one of tachyon universes’, etc.

One of the easiest to explain such possible quaternion structures of the hidden Multiverse is shown in Fig. 5. Its difference from the structure shown in Fig. 3 is the presence in it of several different tachyon universes and antiuniverses located in parallel, corresponding to three imagiз-nary units i_1, i_2, i_3 Another difference is the presence in such a structure of the Multiverse of not only bidirectional portals corresponding to formula (7) and indicated by two-way arrows, but also unidirectional portals corresponding to formulas (8), (9) and indicated by one-way arrows.

In Fig. 5 all these transitions are shown. Moreover, since the data obtained by the WMAP and Planck spacecraft correspond to the not closed screw structures of our hidden Multiverse, united through the corresponding portals with other Multiverses, then all together they form the Hyperuniverse..

8. How to see invisible universes and anti-universes?

But in order to believe in the existence of the Multiverse mentioned in the article instead of the Monoverse mentioned in the textbooks, experimental confirmation of the above is necessary [80]-[97]. Those. it is necessary to prove that in addition to our visible universe, there are other universes and antiuniverses in nature.

And it is possible to do this. After all, invisible universes and anti-universes in outer space, continuously drifting, touch each other in many places and even submerge slightly into each other, forming transitions called portals between the touching universes and anti-universes. And since the constellations in the starry sky in neighboring universes and antiuniverses are always different[10], when moving through portals, the map of the starry sky in them will change, which will prove the existence of invisible universes neighboring the Earth. On Earth there are more than two hundred thousand anomalous zones[11] [98]-[101], which are entrances to portals. Moreover, in some of them observatories are already located. For example, the Main Astronomical Observatory of the Academy of Sciences of Ukraine is 12 km away. from the center of the capital of Ukraine, Kyiv, in the Goloseevsky forest. Therefore, by comparing maps of the starry sky on a computer in portals (or even in anomalous zones) and outside portals, universes neighboring the Earth can be discovered. And as a result of astro-geophysical studies of portals, it will be possible to determine the main parameters of neighboring tachyon universes and antiuniverses. Which will ultimately allow us to determine the structure of our hidden Multiverse.

9. Where are antimatter and anti-time located?

And this structure of the hidden Multiverse allows us to explain another problem that is currently inexplicable within the framework of all physics textbooks - where antimatter is located [102]-[112]. It is clear that it cannot be in our visible universe[12], since due to its annihilation with matter, our universe would then cease to exist. But the fact that antimatter exists has been proven experimentally. In 1995, a sensational result was obtained at CERN - scientists managed to obtain nine antihydrogen atoms, which lasted for about forty billionths of a second. And just one gram of such antihydrogen would cost 662.5 trillion dollars.

Consequently, this experiment can be considered proof that, in accordance with formulas (7)-(9), antimatter can exist in nature in the invisible tardyon and tachyon antiuniverses of the hidden Multiverse and Hyperuniverse. (see Fig. 5). Moreover, in these invisible tardyon and tachyon anti-universes, anti-time and anti-space also exist.

10. Time travels

And the discovery of anti-time already allows us to assert that due to the choice of one or another route of travel in space, time travel also becomes possible [113]-[123], since from formulas (8), (9) it follows that time Δt in universes and antiuniverses during such travel will always change simultaneously with the change in distance l. But since neither the portals, much less the universes and anti-universes of the hidden Multiverse, are still unexplored, time travel in space is now inaccessible to us. And that's why we're interested in time travel on Earth now.

However, although official modern science admits the possibility of time travel in some exotic situations in the special[13] and general[14] theories of relativity, as well as in quantum physics[15] , it still claims that time travel of people on Earth, neither now nor in the distant future, will never be possible.

Nevertheless, these time travels on Earth are now already carried out by airplane flights. And millions of people take part in these flights every day, since upon landing at any airport, air passengers always change their watches to a local time other than at the airport of departure. Thus, they confirm their time travel. Indeed, due to the rotation of the Earth and the presence of time zones on it, movement in space on Earth, as in space, is always accompanied by movement in time.

And when explaining this situation, we must take into account the existence in nature of two different types of time that we will use - internal human time, which we have always used until now, and external time, which, on the contrary, we have never used before. These two times are generated by different processes that exist independently of each other and have different features. Internal time is determined by processes occurring in human bodies. One second is one contraction of the human heart. Therefore, internal time is the biological time of people. External time is determined by processes occurring in the external environment.

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[10] Like all people, everything that is in their apartments

[11] Which in itself confidently – more than two hundred thousand times – also confirms the existence of neighboring universes and anti-universes.

[12] But the textbooks state that there are no other universes in nature besides it. And this, natura-lly, gives reason to doubt the truth of this version of SRT.

[13] For example, in the 'twin paradox'

[14] For example, in a region of ultra-high gravity near the event horizon of a black hole

[15] For example, as a result of teleportation not of information, but of physical objects

Namely, by the rotation of the Earth and the existence of time zones. These features of it are reflected in formula, absent from physics textbooks, derived from the relativistic SRT formulas (5), (6) and (8), (9)

$\Delta t = \Delta t_0\, l / l_0$ (13)

in which Δt is external time in hours;

Δt_0 – 24 hours;

l – path length in the direction perpendicular to time zones;

l_0 – the length of a circle that intersects 24 time zones at a given latitude.

These two different times also have different properties. Human biological time cannot flow backwards. A person cannot return to his youth or childhood. And external time, when changing the direction of movement, can change its sign - the plane can fly across time zones both to the west and to the east. When the speed of movement of the aircraft changes, the value of external time will also change. Therefore, in the external environment it is possible to move both into the past and into the future. Moreover, even short-term movements in external time can sometimes be very useful. This is known to everyone, although it has not yet been used in any way in human activity. But this is a free resource given to us by nature for solving the problem of people traveling through time, which would even seem easy to use (you just need to fly on an airplane).

The only difficulty with this is that such time travel on Earth necessarily involves traveling long distances, which is why they are not used. However, this problem can be overcome. Aircrafts flights must be carried out in compliance with two mandatory conditions:

• the flight of the aircraft must be around the world, i.e. all the time from take-off to

Table 1. Examples of business jet performance flight performance characteristics that could be used for time travels

Aircrafts	Maximum range	Cruising speed	Hourly rates	Seats
Citation Latitude	5 300 km	815 km/h	3 500 €/hour	8
Citation Longitude	7 400 km	910 km/h	5 000 €/hour	12
Challenger 300	5 700 km	850 km/h	4 900 €/hour	8
Challenger 350	5 926 km	850 km/h	4 000 €/hour	9
Challenger 600	5 500 km	850 km/h	4 600 €/hour	12
Challenger 3500	6 297 km	985 km/h	5 500 €/hour	10
Falcon 20	4 200 km	987 km/h	3 900 €/hour	8
Falcon 50/50EX	5 600 km	850 km/h	4 900 €/hour	8-10
Global 5500	10 927 km	900 km/h	8 000 €/hour	16
Gulfstream G150	5 200 km	850 km/h	3 900 €/hour	6-8
Gulfstream G200	5 000 km	870 km/h	6 200 €/hour	8
Hawker 850 XP	4 800 km	750 km/h	3 400 €/hour	6-8
Hawker 900XP	5 400 km	865 km/h	3 700 €/hour	6-8
Hawker 4000	5 280 km	890 km/h	5 400 €/hour	10
Learjet 70	3 815 km	967 km/h	3 500 €/hour	7
Legacy 450	5 370 km	860 km/h	3 300 €/hour	8
Praetor 600	7 400 km	850 km/h	6 000 €/hour	12

Table 2. The value of external time at different latitudes

Location of departure and arrival airfields	Geographic coordinates of the airfield	Size of 24 time zones for a round-the-world flight	Size of one time zone.
Santiago de Chile	33,45° S.	33422 km	1393 km
Buenos Aires	34,60° S.	33021 km	1375 km
Melbourne	37,82° S.	31339 km	1306 km
New York City	40,72º N.	30456 km	1269 км
Reykjavík	64,15° N.	17616 km	734 km
Murmansk	69,58° N.	14424 km	601 km
Kirkenes	69,73° N.	14376 km	599 km
Longyearbyen (Spitsbergen, Norway)	78,13° N.	8184 km	341 km
Alert, (Canada)	82,5° N.	5230 km	218 km

landing at the same airfieldfrom which the plane took off, it must be carried out in the same direction - to the West or to the East, as a result of which, ultimately, the movement of the aircraft in space can be ignored;

• the aircraft must fly at a high enough speed that it will cross each time zone in less than one hour of domestic time

Moreover, there are a great many aircraft models suitable for time travel. They are called business jets[16]. Table 1 illustrates the performance characteristics of some of these business jets. Table 2 lists airfields close enough to the North Pole to provide the shortest possible round-the-world flight route.

Therefore, time travels to the present is already physically and technically feasible.

12. Conclusion

From the above it follows that for Albert Einstein in his version of SRT, it turns out that the most important thing was to prove not physical reality, but, on the contrary, the physical unreality of imaginary numbers. Because otherwise it became clear to everyone that his theory was frankly incorrect.

But the physical reality of imaginary numbers in radio engineering was factually proven by Charles Proteus Steinmetz in his proposed interpretation of Ohm's law back in 1893. That is. before the creation by Albert Einstein and Jules Henri Poincaré in 1905 of the version of SRT that is now studied in all physics textbooks. And since then, radio engineers have never had the slightest reason to doubt this, since always when the frequency of the sinusoidal voltage applied to any electrical *LCR*-circuit changes, the amount of current flowing through it changes. This well-known fact, which occurs in the practical activities of radio engineers literally at every step, is an extremely simple, absolutely understandable and irrefutable proof of the physical reality of imaginary numbers.

And Albert Einstein, in his proposed version of SRT, needed to obligatorily object to this[17]. For this reason, a postulate[18] was introduced into the SRT, called the principle of not exceeding the speed of light, from which a conclusion was made about the physical unreality of imaginary numbers [19], which was not confirmed by any experiments. And only the Nobel Committee - and this causes the greatest respect for it - remained faithful to common sense and scientific integrity. Due to the lack of any experimental evidence of the truth of the proposed version of SRT, despite the fact that Albert Einstein was nominated for the Nobel Prize 66 times, he never received it for this theory.

And in order to preserve the denial of the physical reality of imaginary numbers in SRT, relativistic physicists had to make great sacrifices. In particular, in order to create the impression that it is impossible to refute the statement of SRT about the physical unreality of imaginary numbers, at the Large Hadron Collider (worth ten billion dollars), the OPERA collaboration, which includes more than one hundred of the most authoritative physics professors, carried out the unsuccessful OPERA experiment for almost 15 years[20] (2003-2018), which allegedly had as its goal proving the physical reality of imaginary numbers, but not managed to do it. And thereby allegedly proving the impossibility of refuting the statement about the physical unreality of imaginary numbers. In 2011, its sensationally successful completion was even announced, but six months later in 2012 it was announced that it had been refuted at the same Large Hadron Collider by the ICARUS experiment.

For this reason, numerous publications were ignored, citing simple and easily understood radio engineering experiments that successfully demonstrated the physical reality of imaginary numbers and explained that if imaginary numbers were truly, as claimed in the SRT, physically unreal, then all radio engineering devices and computers would not exist, tsunamis, bell ringing, piano music would not exist, children's swings would not swing after a parent's push, and much more.

Furthermore, because of the assertion of the physical unreality of imaginary numbers and, therefore, the existence of our only visible universe in nature, it turned out that antimatter and tachyons had no place in single visible universe. The corrected version of the SRT, however, explains where they are located.

It also turned out that due to the statement about the physical unreality of imaginary numbers and therefore about the existence in nature of our only visible universe, the phenomena of dark matter and dark energy have not been and will never be explained, since dark matter and dark energy are actually, according to the corrected version of SRT, mutually invisible universes and antiuniverses of the really existing hidden Multiverse.

More than two hundred thousand anomalous zones have also been discovered on Earth, which are entrances to portals to the invisible universes and antiuniverses neighboring our visible universe. And even this

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[16] *A business jet is a small private jet aircraft for transporting a limited number of passengers (usually from 6 to 20) on an individual order for businessmen, officials and VIPs; it features a higher level of comfort, the ability to take off from small airfields and high speed, allowing it to cross time zones in less than one hour of internal passenger and crew time.*

[17] *Unable to explain in any other way the incorrect relativistic formulas of SRT in the hyperlight range of speeds*

[18] *As it turned out later, it turned out to be incorrect and refuted by all published experimental evidence of the physical reality of imaginary numbers.*

[19] *At the beginning of the 20th century, this assumption saved special relativity, as it allowed it to be explained somehow. Otherwise, a theory that its creators couldn't explain would have been of no use to anyone. Therefore, back then, such an assumption, as a temporary measure, was acceptable. But now, in the process of knowledge, it's time to move on.*

[20] *Let's remember - one day is more than enough for a radio engineering experiment proving the physical reality of imaginary numbers.*

alone already proves their existence. Moreover, these universes and antiuniverses, invisible outside the portals, can also be seen by astronomical observations of the starry sky in portals. But these low-cost astronomical observations, which would allow sensational scientific discoveries of other universes, are still not carried out due to fears that these invisible neighboring universes and antiuniverses can actually be seen. And then the version of SRT studied in textbooks will undoubtedly have to be recognized as incorrect.

In the version of SRT studied in physics textbooks, it was also concluded that time travel is impossible for people. Although in fact, millions of air passengers on Earth already make such time travel every day, which is confirmed by the translation of their watches to local time after the planes land. But since such time travel by airline passengers occurs simultaneously with travel on Earth, they are not used. And the article explains how it is still physically and technically possible to travel through time on airplanes without ultimately traveling through space.

Less expensive telephone time travel is also possible, which, when needed, can be implemented quickly and inexpensively. Then telephone conversations with people located in the past or future tense will become publicly available. However, probably the most promising is the joint use of aviation and telephone options for time travel: aviation when crossing time zones over the ocean, and telephone when crossing them over land.

References

1. Antonov A.A. (2022). Dark Matter and Dark Energy, Which are Inexplicable in the Microcosm, are Mutually Invisible Universes and Anti-universes of the Hidden Multiverse. European Journal of Applied Sciences, Services for Science and Education. UK. 13(06). 84-107. DOI:10.14738/aivp.1306.19658.

2. Antonov A. A. 2025. Dark matter and dark energy are mutually invisible universes and anti-universes of the hidden Multiverse. German International Journal of Modern Science. 113. 27- 42. DOI: 10.5281/zenodo.17286973

3. Antonov A. A. 2025. Dark matter and dark energy are invisible universes and anti-universes of the hidden Multiverse. Journal of science. Lyon. 71. 38-52. https://doi.org/10.5281/zenodo.17533496

4. Antonov A. A. 2025. Dark matter and dark energy are mutually invisible universes and anti-universes of the hidden Multiverse. Annali d'Italia. 72. 28-42.
DOI: 10.5281/zenodo.17463768

5. Antonov A. A. 2025. Dark matter and dark energy, which are inexplicable in the microcosm, are universes and anti-universes of the hidden Multiverse. XVIII International Scientific and Practical Conference "Theoretical and practical perspectives of modern science". 28-29.10.2025, Stockholm. Sweden. 69-86. DOI https://doi.org/10.5281/zenodo.17513357

6. Adam T., Agafonova N., Aleksandrov A. et al. (2012). Measurement of the neutrino velocity with the OPERA detector in the CNGS beam. arxiv:1109.4897v4 [hep-ex].

7. Antonov A. A. (2008). Physical Reality of Resonance on Complex Frequencies. European Journal of Scientific Research. 21(4). 627-641.

8. Antonov A. A. (2009). Resonance on Real and Complex Frequencies. European Journal of Scientific Research. 28(2). 193-204.

9. Antonov A. A. (2010). New Interpretation of Resonance. International Journal of Pure and Applied Sciences and Technology. 1(2). 1-12.
http://doi.org/10.17686/sced_rusnauka_2010-888

10. Antonov A. A. (2010). Oscillation processes as a tool of physics cognition. American Journal of Scientific and Industrial Research. 1(2). 342-349.
doi:10.5251/ajsir.2010.1.2.342.349

11. Antonov A. A. (2010). Solution of algebraic quadratic equations taking into account transitional processes in oscillation systems. General Mathematics Notes. 1(9). 11-16.
http://doi.org/10.17686/sced_rusnauka_2010-887

12. Antonov A. A. (2013). Physical Reality of Complex Numbers. International Journal of Management, IT and Engineering. 3(4). 219-230.
http://doi.org/10.17686/sced_rusnauka_2013-898

13. Antonov A. A. (2015). Physical reality of complex numbers is proved by research of resonance. General Mathematics Notes. 31(2). 34-53.
http://www.emis.de/journals/GMN/yahoo_site_admin/assets/docs/4_GMN-9212-V31N2. 1293701.pdf

14. Antonov A.A. (2015). Principle of physical reality of imaginary and complex numbers in the modern cosmology: the nature of dark matter and dark energy. Journal of the Russian physico-chemical Society. 87(1). 328-355.

http://d-oi.org/10.17686/sced_rusnauka_2015-1119

15. Antonov A. A. (2016). Physical Reality and Nature of Imaginary, Complex and Hypercomplex Numbers. General Mathematics Notes. 35(2). 40-63.
http://www.geman.in/yahoo_site_admin/assets/docs/4_GMN-10932-V35N2.31895146. pdf

16. Antonov A.A. (2017). The physical reality and essence of imaginary numbers. Norwegian Journal of development of the International Science. 6. 50-63.
http://www.njd-iscience.com

17. Antonov A. A. (2024). Physical reality of imaginary numbers and their physi-cal essence. Danish Scientific Journal. 80. 25-35. https://doi.org/10.5281/zenodo.10594282

18. Antonov A. A. (2024). Proof of physical reality of imaginary numbers and explanation of their physical essence. German International Journal of Modern Science. 72. 17-27.

19. Anonov A. A. (2024). Physical reality of imaginary numbers and their physical essence. Sciences of Europe. (Praha, Czech Respublic). 133(1). 79-90
DOI: 10.5281/zenodo.10575590

20. Antonov A. A. (2024). Physical reality of imaginary numbers and their physical essence. The scientific heritage. (Budapest, Hungary). 129. 43-53. DOI: 10.5281/zenodo.10558263

21. Antonov A. A. (2024). Proving Physical Reality and Explaining the Physical Essence of Imaginary Numbers. European Journal of Applied Sciences. Services for Science and Education. UK. 12(2). 362-381. DOI:10.14738/aivp.122.16273

22. Antonov A. A. (2024). Proving Physical Reality and Explaining Physical Essence of Imaginary Numbers. Journal of science. Lyon. 50. 25-35.
https://doi.org/10.5281/zenodo.10609816

23. Antonov A. A. (2024). Physical reality of complex numbers and their physical essence. International independent scientific journal. 58. 3-13.
https://doi.org/10.5281/zenodo.10491923

24. Antonov A. A. (2024). Proof of physical reality of imaginary numbers and explanation of their physical essence. Annali d'Italia. 51, 25-35. DOI: 10.5281/zenodo.10573831

25. Antonov A.A. (2021). The special theory of relativity stated in physics textbooks is incorrect. 77th International Scientific Conference of the Eurasian Scientific Association "Theoretical and practical issues of modern science". Moscow. ESA. 11-15. (In Russian)

26. Antonov A. A. (2021). Version of the special theory of relativity that is studied in all physics text-books is incorrect. Österreichisches Multiscience Journal (Insbruck, Austria). 43(1). 17-22. http://osterr-science.com

27. Antonov A. A. (2021). The fallacy of the SRT version studied in physics textbooks proved experi-mentally. Österreichisches Multiscience Journal (Insbruck, Austria). 45(1). 17-26.

28. Antonov A. A. (2021). Generally accepted version of the special theory of relativity contained in physics textbooks is incorrect. The scientific heritage. (Budapest, Hungary). 73(2). 39-43. DOI: 19.24412/9215-0365-2021-73-2-39-43

29. Antonov A. A. (2021). Special theory of relativity presented in physics text-books is wrong. Norwegian Journal of development of the International Science 68(1). 3-7.
DOI: 10.24412/3453-9875-2021-68-3-7.

30. Antonov A. A. (2021). In all physics textbooks an erroneous version of special theory of relativity is given. International independent scientific journal. 31.34-39.
http://www.iis-journal.com

31. Antonov A. A. (2021). All physics textbooks study incorrect special theory of relativity. Sciences of Europe. (Praha, Czech Republic) 79(1). 30-35.
DOI: 10/24412/3162-2364-2021-79-30-35

32. Antonov A. A. (2021). Special theory of relativity, which is studied in physics text-books, is incor-rect. German International Journal of Modern Science. 16, 49-53.
DOI: 10.24412/2701-8369-2021-16-49-53

33. Antonov A. A. (2021). Special theory of relativity, which is studied in all physics textbooks, is incorrect. Danish Scientific Journal. 51(1). 31-35. http://www.danish-journal.com

34. Antonov A. A. (2021). Special theory of relativity taught in all physics text-books is incorrect. Annali d'Italia. 22(1). 39-44. https://www.anditalia.com/

35. Antonov A. A. (2021). Special theory of relativity taught in physics textbooks is wrong. Journal of science. Lyon. 23. 47-52. https://www.joslyon.com/

36. Antonov A. A. (2021). Experimental proofs of infidelity of the version of the special theory of relativity studied in physics textbooks and the truth of its alternative version. 80th International Scientific Conference of the Eurasian Scientific Association "Development of science and education in the conditions of world instability". Moscow. ESA. 8-17.
https://esa-conference.ru/sborniki/?y=2021 (In Russian)

37. Antonov A. A. (2021). Experimental evidences for the fallacy of the SRT version in the physics textbooks. European Journal of Applied Sciences. Services for Science and Education. UK. 9(6). 349-364. DOI:10.14738/aivp.96.11304.

38. Antonov A. A. (2021). If the SRT version in physics textbooks were true, we would never have heard the music of the piano and the bell ringing, there would be no television, no cellular telephony, no radar or GPS navigation, we would not even be aware of the existence of resonance and Ohm's law as interpreted by Steinmetz, and our children could not swing on the swings. The scientific heritage (Budapest, Hungary). 78(2). 41-50.
DOI: 10.24412/9215-0365-2021-78-2-41-50

39. Antonov A. A. (2021). The SRT version in physics textbooks must be correc-ted, because if it were true, there would be no tsunamis or indian summer in nature, we would be never have heard piano music, engineers would be not have been able to create television, cell phones, GPS trackers, and even children would not be able to swing on swings. Danish Scientific Journal. 54(1). 29-38. http://www.danish-journal.com

40. Antonov A. A. (2021). Experimental refutations of the SRT version contai-ned in physics textbooks and confirmations of the truth of its alternative version. German International Journal of Modern Science. 22. 52-61. DOI: 10.24412/2701-8369-2021-22-52-61

41. Antonov A. A. (2021). Experimental evidence of the incorrectness of the SRT version studied in physics textbooks. Annali d'Italia. 25(1). 32-41. https://www.anditalia.com/

42. Antonov A. A. (2021). The incorrectness of the SRT version presented in physics textbooks proven experimentally. Norwegian Journal of development of the International Science. 74(1). 3-7. DOI: 10.24412/2453-9875-2021-74-53-62.

43. Antonov A. A. (2021). Experimental refutations of the generally accepted version of the SRT studied in physics textbooks. International independent scientific journal. 34(1). 23-32. http://www.iis-journal.com

44. Antonov A. A. (2021). Experimental refutations of the SRT version in the physics textbooks. Journal of science. Lyon. 26(1). 29-37. https://www.joslyon.com/

45. Antonov A. A. (2021). Experimental evidences for the fallacy of the SRT version in phisics textbooks. Sciences of Europe (Praha, Czech Republic). 82(2). 19-28.
DOI: 10.24412/3162-2364-2021-82-2-19-28

46. Antonov A. A. (2021). The version of SRT stated in physics textbooks is incorrect, as it denies the existence of radio engineering. 82nd International Scientific Conference of the Eurasian Scientific Association "Scientific results in theory and practice". Moscow. ESA. 11-15. (In Russian) https://esa-conference.ru/sborniki/?y=2021

47. Antonov A. A. (2022). The version of SRT presented in physics textbooks is incorrect, since it follows from it that radio engineering should not exist. European Journal of Applied Sciences. Services for Science and Education. UK. 10(1). 440-445.
DOI://doi.org/10.14738/aivp.101.2022

48. Antonov A. A. (2022). The existence of radio engineering refutes the physics textbooks' version of SRT. The scientific heritage. (Budapest, Hungary). 83(1). 19-22.
DOI: 10.24412/9215-0365-2022-83-1-19-22

49. Antonov A.A. (2022). The fundamental Ohm's law in radio engineering as interpreted by Steinmetz, which proves the physical reality on imaginary capacitive and inductive reactances, refuted the version of the SRT presented in physics textbooks even before its creation. German International Journal of Modern Science. 26. 50-53.
DOI: 10.24412/2701-8369-2022-26-50-63

50. Antonov A.A. (2022). The version of SRT stated in physics textbooks is refuted by the existence of radio engineeng. Danish Scientific Journal. 56. 56-59.
http://www.danish-journal.com

51. Antonov A.A. (2022). The version of SRT presented in physics textbooks is incorrect because it denies the possibility of the existence of Ohm's law as interpreted by Steinmetz and, consequently, the existence of radio engineering. Annali d'Italia. 28(1), 43-47. https://www.anditalia.com/

52. Antonov A.A. (2022). The version of SRT stated in physics textbooks is refuted by the existence of radio engineering. Norwegian Journal of development of the International Science. 78(1). 63-67. DOI: 10.24412/3453-9875-2022-78-63-66.

53. Antonov A.A. (2022). If the physics textbook version of SRT were true, then Ohm's law should not exist in nature, and therefore all radio engineering would not exist. International independent scientific journal. 36. 16-19. http://www.iis-journal.com

54. Antonov A.A. (2022). If the version of SRT in physics textbooks were true, then there would be no radar, no television, no radio navigation, no telecommuni-cation and many other things. Journal of science. Lyon. 28. 76-79. https://www.joslyon.com/

55. Antonov A.A. (2022). The version of SRT set out in physics textbooks is incorrect because it states that Ohm's law as interpreted by Steinmetz does not really exist, and therefore radio engineering does not exist either. Sciences of Europe (Praha, Czech Republic). 87(1). 54-57. DOI: 10.24412/3162-2364-2022-1-54-57

56. Antonov A.A. (2022). The version of SRT set out in physics textbooks is in-correct because it states that Ohm's law as interpreted by Steinmetz does not really exist, and therefore radio engineering does not exist either. Sciences of Europe (Praha, Czech Republic). 87(1). 54-57. DOI: 10.24412/3162-2364-2022-1-54-57

57. Antonov A.A. (2022). Why the physics textbooks teach an incorrect version of the special theory of relativity which denies the existence of radio- and electrical engineering. III international scientific conference "Challenges and problems of modern science." London. Great Britain. 78-86. DOI: https: //doi/org/10.528/zenodo.7486814

58. Steinmetz C. P. (2010). Theory and Calculation of Electric Circuit. Nabu Press. Charlstone.

59. Antonov A. A. (2014). Correction of the special theory of relativity: physical reality and nature of imaginary and complex numbers. American Journal of Scientific and Industrial Research. 5(2). 40-52. doi:10.5251/ajsir.2014.5.2.40.52

60. Antonov A.A. (2023). The Corrected Version of the Special Theory of Relativity. European Journal of Applied Sciences. Services for Science and Education. UK. 11(5). 68-83.
DOI:10.14738/aivp.115.15474

61. Antonov A. A. (2023). Corrected special theory of relativity. Annali d'Italia. 49, 25-35. DOI: 10.5281/zenodo.10214679

62. Antonov A. A. (2023). Special Theory of Relativity. German International Journal of Modern Science. 67. 64-73. DOI: 10.5281/ zenodo.10966458

63. Antonov A. A. (2023). Corrected special theory of relativity. Journal of science. Lyon. 47. 14-23. https://doi.org/10.5281/zenodo.10068983

64. Antonov A. A. (2023). The Corrected Version of the Special Theory of Relativity. The scientific heritage. (Budapest, Hungary). 123. 72-81. DOI: 10.5281/zenodo.10033028

65. Antonov A. A. (2023). The Corrected Version of the Special Theory of Relativity. Norwegian Journal of development of the International Science. 118. 40-49.
https://doi.org/10.5281/zenodo.10009500

66. Antonov A. A. (2023). Alternative Version of the Special Theory of Relativity. Sciences of Europe. (Praha, Czech Republic). 128. 62-71. DOI: 10.5281/zenodo.10081933

67. Antonov A. A. (2023). Corrected Version of the Special Theory of Relativity. Danish Scientific Journal. 77. 88-97. https://doi.org/10.5281/zenodo.10054677

68. Hinshaw G., Larson D., Komatsu E., et al. (2013) Nine Year Wilkinson Anisotropy Probe (WMAP) Observations: Cosmological Parameter Results. arXiv:1213.5226 [astro-ph/CO].

69. Adam R., Ade P.A.R., Aghanim N., et al. (2015). Plank 2015 Results. 1. Overview of Products and Scientific Results. arXiv:1502.01582v2 [astro-ph.CO].

70. Antonov A. A. (2015). Review of publications by A. A. Antonov on the problem of explaining the phenomenon of dark matter and dark energy. Journal of the Russian physic-chemical society. 87(3). 63-76. (In Russian)

71. Antonov A. A. (2015). Hidden Multiverse: explanation of dark matter and dark energy phenomena. International Journal of Physics. 3(2). 84-87. doi:10.12691/ijp-3-2-6

72. Antonov A. A. (2015). Principles and structure of the real Multiverse: explanation of dark matter and dark energy phenomena. American Journal of Modern Physics. 4(1). 1-9. doi:10.11648/j.ajmp.20150401.11

73. Antonov A. A. (2015). Explanation of dark matter and dark energy phenomena. Journal of Science Frontier Research: A Physics and Space Science. 15(1). 33-38.

74. Antonov A. A. (2016). Explaining the Phenomenon of Dark Matter and Dark Energy by Existence of the Hidden Multiverse. Frontiers of Astronomy, Astrophysics and Cosmology. 2(1). 1-9. doi: 10.12691/faac-2-1-1

75. Antonov A. A. (2016). Hypothesis of the Hidden Multiverse: Explains Dark Matter and Dark Energy. Journal of Modern Physics. 7(10), 1228-1246.
doi: 10.4236/jmp.2016.710111

76. Antonov A. A. (2017). Nature of dark matter and dark energy. Journal of Modern Physics. 8(4). 567-582. doi: 10.4236/jmp.2017.84038

77. Antonov A. A. (2017). Hypothesis of the hidden Multiverse explains the phenomenon of dark matter and dark energy. Applied Physics Research. 9(2). 30-41.
doi: https://doi.org/10.5539/apr.v9n2p30

78. Kantor I. L., Solodovnikov A. S. (1989) Hypercomplex Numbers. Springer Verlag, Berlin.

79. Antonov A. A. (2015). Quaternion structure of the hidden Multiverse: explanation of dark matter and dark energy. Global Journal of Science Frontier Research A: Physics and Space Science. 15(8). 8-15.
https://globaljournals.org/GJSFR_Volume15/2-Quaternion-Structure-of-the-Hidden.pdf

80. Antonov A. A. (2020). How to See Invisible Universes. Journal of Modern Physics. 11(05), 593-607. DOI: 10.4236/jmp.2020.115039

81. Antonov A. A. (2020). Universes Being Invisible on Earth outside the Portals Are Visible in Portals. Natural Science. 12(8). 569-587. https://doi.org/10.4236/ns.2020.128044

82. Antonov A. A. (2020). Invisible universes can be seen in anomalous zones. Danish Scientific Journal. 43(1). 9-24. http://www.danish-journal.com

83. Antonov A. A. (2024). Existence of other mutually invisible universes adjacent to our visible universe can be experimentally proven by astronomical observations in the portals of constellations invisible outside the portals. German International Journal of Modern Science. 92. 67-80. DOI: 10.5281/zenodo.14181333

84. Antonov A. A. (2024). Experimental evidence for the existence of other mutually invisible universes neighboring our visible universe. European Journal of Applied Sciences. Services for Science and Education. UK. 12(5). 385-408. DOI:10.14738/aivp.125.17785.

85. Antonov A. A. (2024). Experimentally proved and actually physically existing imaginary numbers as a tool to explain the principle of relativism in SRT. Norwegian Journal of development of the International Science. 144. 69-82.
https://doi.org/10.5281/zenodo.14169132

86. Antonov A. A. (2020). Can invisible universes be seen? International independent scientific journal. 21(2). 51-60. http://www.iis-journal.com

87. Antonov A. A. (2020), How to discover invisible universes. Norwegian Journal of development of the International Science. 42(1). 36-48. http://www.njd-iscience.com

88. Antonov A. A. (2024). Proof of the existence of other mutually invisible universes neighboring to our visible universe by astronomical observations in the portals of constellations invisible outside the portals. Sciences of Europe (Praha, Czech Republic). 153. 93-106.
DOI: 10.5281/zenodo.14227583

89. Antonov A. A. (2021). Invisible universes can be seen in anomalous zones. International independent scientific journal. 23(1). 28-44.

90. Antonov A. A. (2024). Proof of the existence of other mutually invisible universes neighboring to our visible universe by astronomical observations in the portals of constellations invisible outside the portals. Annali d'Italia. 61. 43-57. DOI: 10.5281/zenodo.14230824

91. Antonov A. A. (2024). Proof of the existence of other mutually invisible universes neighboring to our visible universe. Danish Scientific Journal. 90. 111-125.
https://doi.org/10.5281/zenodo.14236925

92. Antonov A. A. (2024). Discovery of other constellations in portals that are invisible outside the portals is experimental proof of the existence of mutually invisible universes adjacent to our visible universe. Polish journal of Science. 80. 24-38. DOI: 10.5281/zenodo.14176574

93. Antonov A. A. (2024). It is possible to prove the existence of other mutually invisible universes adjacent to our visible universe by astronomical observations in the portals of constellations that are invisible outside the portals. Slovak international scientific journal (Bratislava, Slovakia). 89. 51-65. DOI: 10.5281/zenodo.14167109

94. Antonov A. A. (2024). Experimentally proved and actually psychically existing imaginary numbers as a tool to explain the principle of relativism in SRT. The scientific heritage (Budapest, Hungary). 149. 50-63. DOI: 10.5281/zenodo.14214530

95. Antonov A. A. (2024). Existence of other mutually invisible universes adjacent to our visible universe can be experimentally proven by astronomical observations in the portals of constellations invisible outside the portals. International independent scientific journal. 67. 29-42. https://doi.org/10.5281/zenodo.14055388

96. Antonov A. A. (2024). Besides our visible universe, there are other invisible universes. Journal of Science. Lyon. 59. 13-26. https://doi.org/10.5281/zenodo.14049575

97. Antonov A. A. (2024). Discovery of constellations in portals that are invisible outside the portals proves the existence of mutually invisible universes adjacent to our visible universe. Sciences of Europe (Praha, Czech Republic). 94. 34- 48.
DOI: 10.5281/zenodo.14167218

98. Chernobrov V. (2000). Encyclopaedia of mysterious places of the Earth. Veche Publishing House. Moscow. (In Russian)

99. Chernobrov V. (2004). Encyclopaedia of mysterious places of Russia. Veche Publishing House. Moscow. (In Russian)

100. Chernobrov V. (2007). Encyclopaedia of mysterious places of the Earth and space. Veche Publishing House. Moscow. (In Russian)

101. Chernobrov V. (2009). Encyclopaedia of mysterious places of Moskva and Moscow region. Helios ARV. Moscow. (In Russian)

102. Antonov A. A. 2021. Antimatter, Anti-Space, Anti-Time. Journal of Modern Physics, 12(05), 646-660. DOI: 10.4236/jmp.2021.125042.

103. Antonov A. A. 2021. What is our physical world. 71st International Scientific Conference of the Eurasian Scientific Association. Moscow. ESA. 11-15. (In Russian)
https://esa-conference.ru/sborniki/?y=2021

104. Antonov A. A. Antimatter, anti-space, anti-time. (2021). 75th International Conference of the Eurasian Scientific Association "Strategies for Sustainable Development of World Science". Moscow. ESA. 1-4. DOI: 10.5281/zenodo.4926585 (In Russian)

105. Antonov A. A. 2021. Do antimatter, anti-time and anti-space exist in nature. Annali d'Italia. 20(1). 14-24. https://www.anditalia.com/

106. Antonov A. A. 2021. From the alternative version of the SRT it follows that there is not only antimatter, but also anti-space and anti-time. Norwegian Journal of Development of the International Science. 62(1). 41-51. DOI: 10.24412/3453-9875-2021-62-1-41-51

107. Antonov A. A. 2021. Antipodes in space. German International Journal of Modern Science. 11(1). 15-25. DOI: 10.24412/2701-8369-2021-11-1-15-25

108. Antonov A. A. 2021. There is not only antimatter, but also anti-space and anti-time. Journal of science. Lyon. 21. 22-30. https://www.joslyon.com/

109. Antonov A. A. 2021. Where are antimatter, anti-space and anti-time? Österreichisches Multiscience Journal. (Insbruck, Austria). 40(1). 34-44.
http://osterr-science.com

110. Antonov A. A. 2021. Do antmatter, anti-time and anti-space exist in nature? Danish Scientific Journal. 48(1). 64-74. http://www.danish-journal.com

111. Antonov A. A. 2021. Antipodes in space. International independent scientific journal. 28. 50-61. http://www.iis-journal.com

112. Antonov A. A. 2021. How alternative version of SRT explains the existence of antimatter, anti-space and anti-time? The scientific heritage (Budapest, Hungary). 67(1). 11-21. DOI: 10.24412/9215-0365-2021-67-1-11-21

113. Antonov A. A. (2025). Time Travels are Already Possible Nowadays. European Journal of Applied Sciences. Services for science and education. U.K. 13(03). 47-70.
DOI:10.14738/aivp.1303.18764.

114. Antonov A. A. (2025). Time travels are already possible for people on Earth. German International Journal of Modern Science. 104. 64-76. DOI: 10.5281/zenodo.15480577

115. Antonov A. A. (2025). Discovery of the possibility for people on Earth of time travels. Norwegian Journal of development of the International Science. 156. 84-98.
https://doi.org/10.5281/zenodo.15397809

116. Antonov A. A. (2025). The discovery of physically real time travels. Journal of Science. Lyon. 66. 33- 48. https://doi.org/10.5281/zenodo.15584655

117. Antonov A. A. (2025). The physical reality of time travels available to people. Annali d'Italia. 67. 58-72. DOI: 10.5281/zenodo.15545211

118. Antonov A. A. (2025). The physical possibility for people on Earth of time travel. The scientific heritage. 163. 44-58. DOI: 10.5281/zenodo.15728017

119. Antonov A. A. (2025). Proof of the physical reality of time travels available to humans. Danish Scientific Journal. 96. 72-86. https://doi.org/10.5281/zenodo.15553087

120. Antonov A. A. Time travels is now physically possible. XX international scientific conference “The modern vector of the development of science”. Philadelphia. USA. 12-13.06.2025.

121. Antonov A. A. (2025). The physical possibility for people on Earth of time travels. Polish journal of Science. 87. 39-53.

122. Antonov A. A. Time travels is now physically possible. XVI international scientific conference “Theoretical and practical perspectives of modern science”. Stockholm. Sveden. 27-28.05.2025.

123. Antonov A. A. The discovery of physical possibility of time travels. II International Scientific Conference "Expanding knowledge through interdisciplinary research". Sydney. Australia. 15-16.05.2025.

Political sciences

DONALD TRUMP AND "CANCEL CULTURE" IN THE CONTEXT OF THE RUSSIA-UKRAINE CONFLICT

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Abstract

As a globally accessible digital space for public expression, social media has become a powerful mechanism shaping political accountability, public condemnation, and international perception. Through rapid narrative formation and mass participation, online platforms increasingly influence how political leaders are evaluated both domestically and internationally. This article examines cancel culture as a contemporary mechanism of political and reputational pressure, emphasizing its expansion from internal social debates to the level of international politics. Using the presidency of Donald Trump as a case study, the article analyzes how social media outrage, media amplification and allegations of foreign interference transformed domestic political controversies into international reputational crises. Attention is paid to the role of Ukraine and Russia as symbolic representations of external threats to democracy within U.S. public discourse. By analyzing media reactions, public discussions, and political responses, the article identifies key dynamics through which cancel culture operates in the digital political environment and assesses its impact on international relations. The study demonstrates that cancel culture functions not only as a social phenomenon but also as a factor influencing diplomatic credibility and the global image of political leadership.

Keywords: cancel culture; Donald Trump; foreign policy; digital media; Russia-Ukraine conflict; international reputation; social media; U.S. domestic politics.

Introduction

Cancel culture has evolved from a social phenomenon into a significant feature of political life. Initially, it manifested primarily in the online sphere as a tool for exerting pressure on individuals or organizations for their statements, actions, or positions. However, with the development of digital technologies and the growing influence of social media, cancel culture has moved beyond the personal and societal levels, beginning to exert a noticeable impact on political processes, including foreign policy. In the contemporary world, public criticism and boycotts have taken on global significance, as information spreads instantly and any statement by a political leader can provoke an international response.

This phenomenon became particularly prominent during the presidency of Donald Trump. His controversial rhetoric, direct communication with the public through social media, and contradictory positions on key foreign policy issues made him an ideal figure for the operation of cancel culture mechanisms. The media and political opponents actively employed public condemnation, constructing the image of a "toxic" leader, while Trump's supporters viewed these attacks as instruments of pressure and political struggle. As a result, domestic debates in the United States surrounding Trump influenced not only the internal political climate but also international perceptions of U.S. foreign policy. The Russia-Ukraine conflict became one of the key areas in which the consequences of this political dynamic were clearly manifested. Any mention by Trump of Russia, comments on Russia's actions toward Ukraine, or assessments of U.S. assistance to Ukraine triggered extensive media and public reactions. U.S. domestic political disputes-support for or criticism of Trump and his rhetoric on Russia-directly shaped the international discourse. This created a complex situation in which international partners and experts were compelled to consider not only the geopolitical logic of the conflict but also internal political processes in the United States.

The case of Donald Trump demonstrates how the phenomenon of cancel culture is integrated into the political and foreign policy sphere of the United States, shaping both domestic and international discourses. During Trump's presidency, and especially after the 2016-2020 election cycle, his actions and statements regarding Russia and Ukraine became the subject of widespread political and media attacks that largely took

the form of "cancellation" - public condemnation, deprivation of political legitimacy, and pressure from opponents.

Main part

The first and most well-known episode illustrating the connection between Donald Trump's actions and the mechanisms of cancel culture was his phone call with the President of Ukraine, Volodymyr Zelensky, on July 25, 2019 [1]. During the conversation, Trump repeatedly asked the Ukrainian side to "do us a favor," implying the need to investigate Joe Biden and his son Hunter in connection with the Ukrainian company Burisma. The fact that this discussion occurred in parallel with the issue of providing military aid to Ukraine created the impression of political pressure and an attempt to use foreign policy resources to achieve personal electoral goals within the United States. After the transcript of the conversation was published in September 2019, the situation instantly escalated into a large-scale socio-political crisis in which the mechanisms of cancel culture manifested themselves fully. Social networks, media outlets, and public activists actively disseminated interpretations of the events as an abuse of power and a violation of democratic accountability principles. Digital mobilization developed especially rapidly: users of Twitter, Facebook, and other platforms formed campaigns demanding that Trump be held accountable [2]. In this context, cancel culture functioned as an instrument of collective moral condemnation, amplified by network dynamics and the logic of viral information spread. Trump's opponents used the digital space to maximize the publicity of the situation and exert pressure on political institutions. In contemporary political discourse, media attention is a form of power, and it was precisely this attention that became the decisive factor transforming a diplomatic episode into a major political scandal. Within the framework of cancel culture, such attention operates as a mechanism of delegitimization: the accused political actor is "removed" from the public sphere through public moral condemnation even before formal decisions are made.

For Trump himself, this episode marked the moment when cancel culture was directed against him as a political figure. His opponents interpreted what had happened not as a diplomatic episode but as a direct violation of presidential ethics. Within the United States, this became the basis for initiating impeachment proceedings-a formal political and legal form of "cancellation" of the head of state. Although impeachment is a constitutional instrument, the logic of the events themselves-mass media pressure, emotionally charged public debates, and the rapid formation of a negative narrative-fully corresponds to the mechanisms of cancel culture. Ukraine in this process appeared not so much as an independent participant as an object of struggle between American political camps. The state simultaneously experienced pressure from the United States and became an element of the domestic political agenda. This underscores how cancel culture can extend beyond national politics and affect international relations. Thus, the episode of the phone call became not only the cause of Donald Trump's first impeachment but also an example of how the digital mechanisms of cancel culture can transform an isolated political action into a major institutional crisis. It demonstrated that in the conditions of an information society, reputational attacks, public condemnation, and media pressure can play a role comparable to legal procedures, turning cancel culture into an important component of contemporary political struggle.

Further developments became evident in 2020, when Donald Trump retweeted audio recordings containing unverified information that many analysts and intelligence officials linked to a Russian disinformation campaign aimed at influencing the U.S. presidential elections. These audio materials consisted of fragments of conversations discussing alleged corrupt or politically sensitive actions by Trump's opponents, primarily representatives of the Democratic Party. Publishing such materials on the official account of the president gave them significant political weight, which immediately provoked a sharp reaction from the media, experts, and government institutions. Intelligence agencies warned that the dissemination of such "leaks" potentially strengthens the efforts of foreign actors seeking to interfere in U.S. domestic political processes [3]. Trump, in turn, insisted that he was merely sharing "interesting" and "important" information, but for his opponents this step became confirmation of accusations that the president was facilitating the spread of disinformation undermining the country's political stability. This reaction activated the mechanisms of cancel culture: the digital space filled with accusations of irresponsibility, violations of national security, and political unethical behavior. In social networks, the dynamics of rapid negative narrative formation once again emerged. Twitter users, analysts, journalists, and activists launched broad discussions about whether Trump was consciously or unconsciously disseminating materials created or modified by foreign intelligence services. Such media resonance became a form of collective moral condemnation characteristic of cancel culture, when the actions of a leader are interpreted through the prism of threats to the public good and immediately trigger demands for political accountability. Ukraine and Russia in this episode once again appeared not only as geopolitical actors but also as symbols of external interference and information manipulation. For American society, these countries became part of a broader narrative about an external threat to democracy, and their

mention in the context of Trump's publications only intensified suspicions about the insecurity of his behavior. As a result, cancel culture reached the international level: criticism of the president became not only a domestic phenomenon but also a factor influencing how the United States was perceived by its allies and partners. Global media actively discussed whether Trump's actions met expectations of a leader of a democratic state, turning the episode into an international reputational crisis [4]. The digital sphere became the arena in which a global discourse was formed about the reliability of American institutions, the country's resilience to foreign influence, and the ability of its leaders to act in accordance with national interests. Thus, this case illustrates how cancel culture can transform from an internal instrument of moral pressure into a mechanism for shaping international perceptions of a state and influencing its foreign policy positions.

The 2025 situation related to the phone call between Donald Trump and Russian President Vladimir Putin became the next step in the development of the same political logic, in which foreign policy actions are closely intertwined with the mechanisms of cancel culture. After the call, Trump publicly stated that there had been a "long and productive dialogue," but the content of the conversation was not disclosed, which immediately caused concern in Ukraine and among its European partners. In Kyiv, this statement was perceived as a signal that Washington might begin discussing issues of security, war, and the future of the region without Ukraine's participation. In effect, there was a sense that the country was once again becoming not a subject but an object of a major geopolitical deal. Trump's public comments, made before official explanations from the State Department or the Pentagon, became a factor undermining established expectations among allies. Within the logic of cancel culture, this appeared as a "cancellation" of previous U.S. commitments to Ukraine and NATO - not through official documents, but through symbolic politics, statements, and sudden rhetorical shifts. Such a move raised doubts about the predictability of American foreign policy: U.S. partners began to fear that long-standing guarantees were no longer immutable and could be revised at any moment depending on the president's decisions and personal strategy. International observers and security experts noted that such communication creates an effect of strategic uncertainty [5]. It not only changes perceptions of current commitments but also affects long-term trust in the United States as the leader of the Western bloc. There is an impression that previous agreements reached through multilateral mechanisms can be devalued by a single political statement. This is particularly dangerous in conditions of ongoing conflicts and the high dependence of European countries on American defense guarantees. In this episode, cancel culture manifested itself not in the form of a personal boycott but in the destruction of previous political frameworks. A kind of "cancellation" of the former foreign policy line built around support for Ukraine and the containment of Russia occurred. Public recalibration of relations became an instrument of pressure and a signal of a possible revision of the strategic course. Such uncertainty increases anxiety among allies and creates conditions in which international actors are forced to adjust their own policies, considering the likelihood of sharp and unpredictable changes on the part of the United States. Thus, the 2025 case demonstrates how elements of cancel culture can be used not only in domestic politics but also in international relations. Through public statements, rhetorical signals, and information dynamics, new expectations are formed and old ones are undermined, making the international system more unstable and susceptible to political fluctuations.

Conclusion

An analysis of these cases allows for several important conclusions regarding how cancel culture manifests itself at the international level and influences global politics.

First, internal political competition, including media campaigns and attempts to delegitimize a political leader, can directly affect a state's foreign policy. When the figure of the president becomes the object of large-scale public pressure, his actions in the international arena begin to be viewed through the prism of internal conflicts. This leads to allies and partners being drawn into the dynamics of American political struggle, effectively becoming instruments or arguments within it. Thus, domestic cancel culture extends beyond its boundaries and begins to influence the perceptions and strategic decisions of other states.

Second, digital platforms and global media act as key intermediaries amplifying political signals. They shape international discourse faster than traditional diplomatic channels, creating an effect of instantaneous reputational reaction. As a result, cancel culture in the digital space becomes not merely an internal mechanism of moral control but a factor determining the international agenda: assessments, accusations, and interpretations spread globally, affecting relations between states and the formation of global public opinion [6].

Third, cancel culture in international politics manifests itself through the public destruction of expectations and the revision of previous commitments. It generates strategic uncertainty, in which allies cannot be confident in the stability of the U.S. political course, while adversaries seek to exploit these fluctuations to their advantage. Such uncertainty undermines the system of international trust, creates new lines of tension, and restructures the balance of influence among states. The public nature of these processes like

statements on social media, resonant media narratives, leaks, and rhetorical signals only amplifies the destabilizing effect. Taken together, these conclusions show that cancel culture has ceased to be an exclusively social phenomenon and has become a significant element of contemporary international politics, influencing strategic decisions, foreign policy alliances, and perceptions of global stability.

References

1. Currier, C., & Reitman, R. (2019). Analysis of the Trump-Zelensky call. The Intercept.
2. Benkler, Y., Faris, R., & Roberts, H. (2018). Network Propaganda: Manipulation, Disinformation, and Radicalization in American Politics. Oxford University Press.
3. Mueller, R. S. (2019). Report on the Investigation into Russian Interference in the 2016 Presidential Election. U.S. Department of Justice.
4. Benkler, Y., Faris, R., & Roberts, H. (2020). Mail-In Voter Fraud: Anatomy of a Disinformation Campaign. Berkman Klein Center Research Publication, Harvard University.
5. Snyder, G. H. (1984). "The Security Dilemma in Alliance Politics." World Politics, 36(4), 461–495.
6. Entman, R. M. (2004). Projections of Power: Framing News, Public Opinion, and U.S. Foreign Policy. University of Chicago Press.

Technical sciences

PREDICTORS OF VICTIMIZATION BEHAVIOR IN THE CONTEXT OF CYBER FRAUD: THE ROLE OF EMOTIONAL LABILITY AND PERSONALITY TRAITS

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ПРЕДИКТОРЫ ВИКТИМНОГО ПОВЕДЕНИЯ В КОНТЕКСТЕ КИБЕРМОШЕННИЧЕСТВА: РОЛЬ ЭМОЦИОНАЛЬНОЙ ЛАБИЛЬНОСТИ И ЛИЧНОСТНЫХ ЧЕРТ

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Abstract

This article examines predictors of victimization behavior that increase the risk of becoming a victim of cyber fraud. It focuses on the role of certain personality traits and emotional lability in shaping victimization behavior in the digital space. The authors identified and analyzed predictors of victimization behavior associated with emotional instability and personality characteristics that make individuals vulnerable to the manipulative actions of cyber fraudsters. The study includes an analysis of existing scientific papers and constructs a model using psychodiagnostic methods. The paper examines personality traits such as gullibility, impulsivity, low self-control, and anxiety, as well as their relationship with emotional lability. The key findings indicate that emotional lability (instability of the emotional state, a tendency to experience sudden mood swings) combined with certain personality traits (e.g., gullibility, low critical thinking, and risk propensity) significantly increases the likelihood of becoming a victim of cyber fraud. Such people are more likely to succumb to manipulative tricks and make decisions based on emotions rather than rational analysis of the situation.

Аннотация

Статья посвящена изучению предикторов виктимного поведения, повышающих риск стать жертвой кибермошенничества. Основное внимание уделяется роли определённых личностных черт и эмоциональной лабильности в формировании виктимного поведения в цифровом пространстве. Авторы выявили и проанализировали предикторы виктимного поведения, связанные с эмоциональной неустойчивостью и характеристиками личности, которые делают человека уязвимым для манипулятивных действий кибермошенников. Исследование включают анализ существующих научных работ, а также построена модель с помощью психодиагностических методик. В работе рассматриваются такие личностные черты, как доверчивость, импульсивность, низкий самоконтроль, тревожность, а также их взаимосвязь с эмоциональной лабильностью. Основные результаты показывают, что эмоциональная лабильность (нестабильность эмоционального состояния, склонность к резким перепадам настроения) в сочетании с определёнными личностными чертами (например, доверчивостью, низкой критичностью, склонностью к риску) значительно повышают вероятность стать жертвой кибермошенничества. Такие люди чаще поддаются на манипулятивные уловки, принимают решения под влиянием эмоций, а не рационального анализа ситуации.

Keywords: predictors, victim behavior, emotional lability, cybersecurity, cybercrime, personal characteristics.

Ключевые слова: предикторы, виктимное поведение, эмоциональная лабильность, кибербезопасность, киберпреступления, личностные характеристики.

Виктимное поведение в киберпространстве

Понимание психологических факторов, способствующих виктимному поведению в интернете, приобретает особое значение в контексте разработки эффективных мер профилактики и повышения цифровой безопасности пользователей. Одним из ключевых направлений таких исследований является изучение эмоциональной лабильности и личностных черт, влияющих на уязвимость пользователей к манипуляциям и мошенническим схемам.

Понимание того, почему некоторые люди становятся жертвами в интернете, является особенно важным, когда речь идет о защите пользователей от мошенников и повышении их цифровой грамотности. Исследователи уделяют большое внимание изучению особенностей характера и эмоций, которые делают людей более восприимчивыми к обману и манипуляции.

Эмоциональная лабильность отражает способность быстро переходить от одного эмоционального состояния к другому и проявляется в повышенной чувствительности к стрессовым ситуациям, трудностях с регуляцией эмоций и импульсивности. Высокий уровень эмоциональной лабильности может снижать способность критически оценивать информацию и адекватно реагировать на потенциальные угрозы в цифровой среде. Это создаёт благоприятные условия для возникновения виктимного поведения при взаимодействии с мошенниками, использующими психологическое давление и эмоциональные триггеры.

Личностные черты, такие как уровень экстраверсии, нейротизма, добросовестности, открытости опыту и нравственности, также играют важную роль в формировании устойчивости к киберрискам. Например, высокий уровень нейротизма может усиливать тревожность и восприимчивость к страху, что используется мошенниками для достижения своих целей. Недостаток добросовестности или низкая уверенность в себе могут приводить к повышенной доверчивости и сниженной бдительности в сети. Между тем, открытость новому опыту и экстраверсия могут одновременно способствовать расширению социальных контактов и увеличению риска столкновения с вредоносным поведением в интернете.

Актуальность исследования заключается в необходимости комплексного анализа, который объединяет влияние эмоциональной лабильности и различных личностных характеристик на виктимность в контексте кибермошенничества. Несмотря на наличие отдельных работ, посвящённых либо эмоциональному состоянию, либо личностным факторам, их совместное изучение остаётся недостаточно детализированным. Это препятствует формированию точных прогностических моделей и снижает эффективность разрабатываемых профилактических программ, ориентированных на цифровую безопасность.

Виктимное поведение в киберпространстве представляет собой комплекс реакций и моделей поведения личности, которые способствуют её уязвимости перед разнообразными формами киберпреступлений. В цифровой среде наиболее распространёнными являются фишинг – создание поддельных веб–сайтов для получения конфиденциальной информации, вишинг – телефонные мошеннические схемы с имитацией официальных служб, письма с ложными уведомлениями о выигрыше и романтическое мошенничество, осуществляемое через онлайн-знакомства с целью получения материальной выгоды. Такие формы кибермошенничества ориентированы на эксплуатацию психологических особенностей жертвы, включая её доверчивость и эмоциональную восприимчивость [6].

С психологической точки зрения виктимность связана с определёнными личностными и поведенческими характеристиками. По классификации Д.В. Ривмана выделяются активный тип виктимного поведения, проявляющийся через агрессию и импульсивность, пассивный тип, связанный с тревожностью и низкой самооценкой, а также некритичный тип, который характеризуется чрезмерной доверчивостью и недостатком жизненного опыта. Все эти типы отражают различные механизмы восприятия и реакции на угрозы, что особенно важно в контексте киберпространства, где границы между реальным и виртуальным часто размыты [7].

Для виктимных лиц характерно неэффективное сопротивление нарушению личных границ, а также склонность уклоняться от активной жизненной позиции. Это проявляется в неспособности критически оценивать информацию и принимать решения в условиях неопределенности, что

усиливается недостаточным уровнем социального интеллекта, наивностью и низким самоконтролем. В совокупности такие черты приводят к повышенной уязвимости перед кибермошенниками, использующими психологическое давление и манипулятивные техники [7].

Особое значение имеют индивидуально–психологические факторы, такие как тревожность, неуверенность в себе, подверженность перепадам настроения и высокая эмоциональная восприимчивость. Если эти особенности сочетаются с низким эмоциональным комфортом и недостаточной способностью отказывать, что создает предпосылки для виктимизации через кибербуллинг и манипулятивные схемы. Кроме того, беспечность, желание быстрого и легкого заработка, а также низкий уровень знаний в области информационной безопасности усугубляют риски стать жертвой мошеннических действий [8].

Важным аспектом является времяпрепровождение в сети и степень пренебрежения правилами безопасности, что также связано с личностными характеристиками и уровнем эмоциональной регуляции. Чем выше пренебрежение базовыми мерами защиты, тем выше риск попасться на уловки преступников, создающих доверительную атмосферу и эксплуатирующих эмоциональные триггеры пользователей [7].

Теоретическая база психологического анализа виктимного поведения опирается на различные концепции, включая теорию повседневной деятельности и общую теорию преступного поведения. Эти подходы помогают выявить, каким образом личностные факторы и поведенческие стереотипы предопределяют склонность к виктимизации. Важным является интегративное понимание, учитывающее не только когнитивные аспекты, но и эмоционально–личностный фон, влияющий на выбор стратегии реагирования на угрозы в цифровом пространстве [9].

Таким образом, виктимное поведение в интернете – это результат взаимодействия комплекса психологических и социальных факторов, при этом характерной чертой таких лиц становится сочетание низкого самоконтроля, эмоциональной уязвимости и дефицита критического мышления. Осознание этих механизмов является основой для разработки целевых программ профилактики и повышения цифровой грамотности, направленных на укрепление защиты пользователей от цифрового мошенничества.

Эмоциональная лабильность характеризуется быстрой и резкой сменой эмоциональных состояний, когда человек переходит от положительных эмоций к отрицательным и обратно. Это явление выходит за рамки обычного колебания настроения или раздражительности, отражая более глубокую нестабильность психоэмоциональной сферы. Такие изменения часто сопровождаются низкой толерантностью к фрустрации, внезапными плачами и вспышками гнева, что указывает на трудности в поддержании эмоционального равновесия в ответ на внешние и внутренние стимулы [3].

Наряду с этим, эмоциональная лабильность связана с рядом психических и неврологических состояний, таких как пограничное расстройство личности, биполярное расстройство, посттравматическое стрессовое расстройство и другие. Кроме того, она может возникать в результате психоактивной интоксикации или повреждений головного мозга, что подтверждает её нейробиологический и психологический компоненты. Повышенная эмоциональная неустойчивость снижает способность к адаптивной регуляции эмоциональных реакций, что проявляется в затруднениях принятия рациональных решений при столкновении с социальными стрессорами [2].

В контексте виктимного поведения эмоциональная лабильность усиливает сомнения в себе, снижает самоуверенность и вызывает затруднения в принятии решений. Для жертв насилия, особенно эмоционального, это становится существенным фактором, способствующим сохранению дисфункциональных паттернов восприятия и реагирования на внешние угрозы. Психологические последствия эмоциональной лабильности включают не только внутренние страдания, но и изменённое поведение, которое делает личность более уязвимой к манипуляциям и контролю со стороны обидчиков, приводя к усилению виктимности [1].

Особый интерес представляет влияние эмоциональной лабильности на восприятие жертвы со стороны окружающих. Исследования демонстрируют, что эмоциональная реакция пострадавшего активирует в наблюдателях сложные когнитивно–аффективные процессы, которые могут усиливать либо ослаблять доверие к достоверности его показаний. Два взаимосвязанных механизма – эмоциональный отклик наблюдателя и нарушение ожиданий – выступают медиаторами в формировании оценки жертвы. Когнитивная нагрузка, в частности, способна усиливать этот эффект, активируя «горячие» когнитивные процессы, что указывает на сложность взаимодействия эмоционального и рационального в процессе социальной оценки.

Виктимное поведение в контексте киберпреступлений подразумевает сочетание факторов, действий и реакций человека, существенно повышающих риск стать жертвой мошеннических схем в

интернете. Рассмотрим основные этапы и компоненты модели виктимного поведения при кибермошенничестве:

Этапы модели виктимного поведения:

1.Низкая цифровая грамотность. Недостаточные знания о технологиях кибербезопасности и мерах предосторожности в интернете. Незнание признаков фишинга, вредоносных программ и распространенных схем мошенничества.

2.Импульсивность и поспешность. Эмоциональная лабильность, быстрая реакция на уведомления и сообщения без предварительной проверки их легитимности. Быстрое нажатие на ссылки или ввод персональных данных без достаточных оснований.

3.Недостаточный скептицизм. Легкое доверие к незнакомым лицам и ресурсам в интернете. Вероятность считать любую рекламу или уведомление от известных брендов абсолютно надежными.

4. Игнорирование сигналов опасности. Невнимание к предупреждениям браузеров, антивирусов или банков о возможной угрозе. Неприятие советов друзей и родственников, настаивающих на повышенной осторожности.

5. Страх потерять что–то важное (синдром упущенной выгоды). Боязнь упустить выгоду (лотереи, скидки, акции), вызвать гнев начальства или утратить доступ к счету. Настойчивое следование инструкциям мошенников под влиянием сильного стресса или испуга.

6. Переход к действиям, ведущим к ущербу Ввод реквизитов банковских карт, скачивание вредоносных файлов, передача важной информации третьим лицам. Передача денег мошеннику через переводы или оплату товаров и услуг.

7. Осознание совершённой ошибки. Потеря денег, взлом аккаунтов, кража данных или повреждение устройств. Чувство стыда, сожаления, раскаяния и вины за допущенную ошибку.

8. Закрепление виктимного поведения. Повторение предыдущих действий в аналогичных ситуациях ввиду низкого уровня критики и цифровых навыков. Игнорирование уроков прошедших событий и отказ учиться защищать себя от атак.

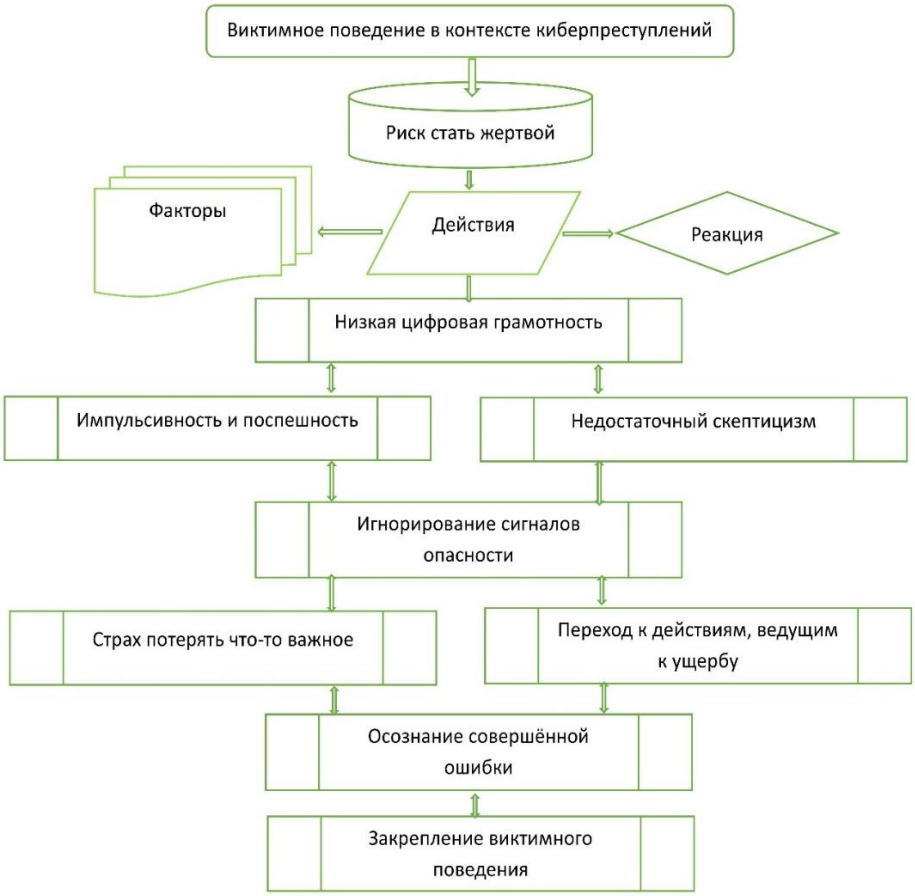

Рисунок 1. Модель виктимного поведения

Таким образом, эмоциональная лабильность оказывает двойное воздействие: на внутреннее состояние личности, снижая её психологическую устойчивость и способность к самоэффективности, а также на социальное восприятие со стороны других, влияя на интерпретацию действий и слов жертвы.

Это создает дополнительный слой сложности в процессах психологической помощи и социальной поддержки, затрагивая как субъективное восприятие, так и межличностные коммуникации.

Личностные характеристики влияют на их риск стать жертвами киберпреступлений, выступая косвенными предикторами виктимного поведения. Большое исследование, охватившее 3648 респондентов из Нидерландов, показало, что личностные черты по пятифакторной модели – экстраверсия, доброжелательность, сознательность, эмоциональная устойчивость и открытость опыту – не являются уникальными для киберпреступности, а скорее связаны с виктимностью в целом. При этом эмоциональная устойчивость снижает вероятность стать жертвой именно киберпреступлений в сравнении с традиционной преступностью, а высокая открытость опыту увеличивает риск столкновения с киберопосредованными преступлениями, такими как мошенничество или интернет–угрозы [5].

Импульсивность и низкий уровень самоконтроля также выделяются как значимые факторы риска. Исследование Т. Холта демонстрирует, что люди с низкой способностью к длительному планированию и откладыванию удовлетворения чаще подвергаются заражениям вредоносным ПО – троянами и вирусами – и создают ситуации, благоприятные для атак. Эти лица проявляют тенденцию к быстрому реагированию на внешние стимулы без оценки последствий, что повышает их уязвимость в цифровой среде [6].

Экстраверсия, характерная для общительных и активных подростков, повышает восприимчивость к социальным инженерным атакам – манипуляциям, направленным на получение информации под видом доверительного общения. Экстраверты чаще вступают в новые социальные взаимодействия, что увеличивает их экспозицию к потенциальным мошенникам. При этом большинство других личностных черт, за исключением открытости, влияют на риск косвенно, через поведенческие факторы, подчеркивая сложность взаимодействия личности и окружения в цифровой сфере [4].

Важно отметить, что личностные типы воздействуют на формы поведения и способы взаимодействия в сети, что выявлено в медиаторных моделях современного исследования. Личность определяет набор поведенческих стратегий: кто–то более склонен к рисковому поведению и невнимательности к мерам безопасности, а кто–то – к излишней осторожности. Эти поведенческие особенности прямо влияют на вероятность виктимизации в интернете, что указывает на необходимость комплексного подхода к изучению проблемы [2].

Социальные аспекты киберпреступности, включая влияние личности, традиционно недооцениваются при разработке мер защиты. Междисциплинарное интегрирование психологических и технических исследований открывает перспективы для выработки более адресных и эффективных стратегий профилактики. Понимание характера личностных предикторов и их влияния на поведение в сети помогает формировать индивидуализированные рекомендации по цифровой безопасности и снижать уязвимость подростков к манипуляциям [5].

Таким образом, личностные черты, такие как тревожность, импульсивность, экстраверсия, открытость опыту и эмоциональная стабильность, детерминируют косвенные и поведенческие механизмы повышения риска виктимного поведения в цифровом пространстве. Учитывая разнообразие этих факторов, необходимы адекватные психодиагностические инструменты для их точного измерения. Понимание личности важно для выбора адекватных методик изучения этих факторов, что позволит глубже и достовернее выявлять предпосылки уязвимости подростков в условиях кибермошенничества.

Мы предлагаем модель оперативного когнитивно–эмоционального вмешательства (ОКЭВ–модель). ОКЭВ–модель представляет собой структурированный алгоритм для быстрого снижения виктимности пользователей во время кибератак путем интеграции когнитивных техник переработки информации и эмоциональной регуляции. Модель ориентирована на преодоление психологических уязвимостей, таких как импульсивность и недооценка рисков, через мотивацию к безопасности и изменение восприятия угроз.

Эта модель предназначена для экстренного реагирования на попытку мошенничества онлайн и состоит из шести последовательных фаз, каждая из которых обеспечивает эффективный выход из ситуации:

Триггер – появление признаков подозрительности, неожиданного или странного обращения в Интернете. Обычно связано с такими факторами, как внезапные уведомления о выигрыше, просьбы срочно перевести деньги, фишинговые письма или фальшивые веб–сайты. Например, пользователь получает сообщение якобы от банка с требованием немедленно ввести пароль и реквизиты карты для срочного обновления аккаунта.

Стимул – описание: признаки угрозы начинают осознаваться сознанием. Человек испытывает эмоции страха, беспокойства или замешательства. Одновременно возникают сомнения в подлинности сообщений и ситуации. Например, сообщение вызывает волнение и беспокойство, желание скорее разобраться в ситуации и обезопасить себя.

Декодирование – начинается сознательный анализ ситуации, попытка распознать угрозу и собрать дополнительную информацию. Необходимо сразу обратить внимание на признаки мошенничества: неизвестные отправители, плохая грамматика, требования немедленных действий, необычность запросов. Например, пользователь внимательно смотрит на адрес электронной почты, название сайта, просит близких посоветоваться, звонит официальному сервису банка.

Перефокусировка – попытка отвлечься от паники и сосредоточиться на действиях, защищающих себя и данные. Нужно временно прекратить любые операции, закрыть вкладки браузера, перезагрузить компьютер, убедиться в отсутствии посторонних приложений. Например, пользователь закрывает письмо, отказывается вводить запрашиваемые данные, отключается от сомнительных сервисов и удаляет подозрительное приложение.

Регуляция и действие – решительная реакция на угрозу с одновременной регуляцией эмоционального состояния. Следует обратиться в службу поддержки официального ресурса, сменить пароли, уведомить органы правопорядка или руководство учреждения о случившемся инциденте. Например, пользователь незамедлительно обращается в банк по официальным каналам, подтверждает свою учетную запись, обновляет антивирус и меняет пароли.

Рефлексия – завершающий этап, на котором производится ретроспективный анализ произошедшего инцидента, фиксируется полученный опыт и делается упор на дальнейшую осторожность и бдительность. Пользователь учится извлекать уроки из происшедшего, повышая общий уровень цифровой гигиены и осведомленности. Например, пользователь принимает решение больше доверять официальной информации, чаще проверять почту на предмет фишинга, осваивает новые методы защиты данных и делится опытом с окружающими.

Итак, следует отметить важные моменты для моделирования когнитивно-эмоционального вмешательства: во время обработки триггера важно оставаться внимательным и настороженным; при стимуле надо сохранять спокойствие и не торопиться реагировать; декодирование должно проводиться качественно и осторожно, принимая во внимание все сигналы опасности; перефокусировка важна для избавления от паники и сосредоточения на защитных действиях; регуляция требует быстрых, уверенных и целенаправленных реакций; рефлексия помогает закрепить положительный опыт и подготовиться к возможным будущим ситуациям.

Рисунок 2. Модель оперативного когнитивно–эмоционального вмешательства

Исследование показало, что эмоциональная лабильность и личностные черты играют значительную роль в формировании виктимного поведения в контексте кибермошенничества. Участники с высокой эмоциональной нестабильностью оказались более подвержены риску попасться на уловки преступников вследствие импульсивных реакций и низкой способности к критическому мышлению в стрессовых ситуациях. Вместе с тем выявлены корреляции между некоторыми личностными особенностями (такими как высокий уровень тревожности, низкая степень открытости новому опыту и высокая покладистость) и вероятностью стать жертвой кибератаки.

Полученные результаты подтверждают важность учета индивидуально–психологических характеристик при разработке профилактических программ и образовательных курсов по кибербезопасности. Особое внимание необходимо уделять обучению навыкам распознавания попыток мошенничества, укреплению эмоциональной стабильности и развитию критического мышления у людей с повышенным риском виктимного поведения.

Таким образом, предложенные модели позволяют глубже понять механизмы, лежащие в основе попадания в ловушки кибермошенников, и служат основой для разработки персонализированных мер профилактики и защиты. Дальнейшие исследования должны быть направлены на верификацию выявленных зависимостей и разработку инновационных подходов к подготовке специалистов и широкой аудитории для эффективной защиты от киберпреступлений.

Список литературы

1. Воронцов, Я. А. Современная социальная инженерия: методы воздействия и противодействия / Я. А. Воронцов // Информатика: проблемы, методы, технологии : материалы XXIII Международной

научно-практической конференции им. Э. К. Алгазинова (Воронеж, 15–17 февраля 2023 года). –Воронеж : Воронежский государственный университет, 2023. –С. 782–788.

2. Глебов, В. Г. Виктимологические обстоятельства как элемент предмета доказывания по уголовным делам / В. Г. Глебов // Актуальные проблемы противодействия преступности в России и пути их решения : Всероссийская научно-практическая конференция : сборник научных трудов (Москва, 21 марта 2024 года). –Москва : Московский университет МВД РФ им. В. Я. Кикотя, 2 prepared. –С. 69–72.

3. Жмуров, Д. В. Кибервиктимология: концептуальные основы учения о жертве киберпреступлений / Д. В. Жмуров. –2-е изд., испр. и доп. – Санкт-Петербург : Издательство «Наукоёмкие технологии», 2024. –410 с. –ISBN 978-5-907804-40-1.

4. Китова, А. С. Виктимологический аспект преступлений в сфере компьютерной информации в сети Интернет / А. С. Китова // Уголовное право: вопросы теории и практики : сборник докладов Всероссийского студенческого научно-практического круглого стола с международным участием (Санкт-Петербург, 17 февраля 2023 года) / под ред. Е. Н. Рахмановой, Е. А. Писаревской, М. А. Дворжицкой. –Санкт-Петербург : Центр научно-информационных технологий «Астерион», 2023. –С. 219–223.

5. Майоров, А. В. Виктимологический аспект мошенничества / А. В. Майоров, Н. Е. Яременко // Виктимология. –2019. –№ 3. –С. 36–40.

6. Потиенко, Д. А. Актуальные тенденции на рынке информационной безопасности / Д. А. Потиенко, Д. С. Чмыхало // Инновационные научные исследования: теория, методология, тенденции развития : сборник научных статей по материалам XVI Международной научно-практической конференции (Уфа, 25 февраля 2025 года). –Уфа : ООО «Научно-издательский центр „Вестник науки“», 2025. –С. 13–19.

7. Ривман Д.В. Криминальная виктимология. СПб.: Речь, 2012.

8. Тулупьева, Т. В. Психологические аспекты информационной безопасности организации в контексте социоинженерных атак // Управленческое консультирование. –2022. –№ 2. –С. 123–138.

9. Узденов, Р. М. Новые границы киберпреступности // Всероссийский криминологический журнал. –2016. –Т. 10, № 4. –С. 651–652.

INVESTIGATION OF THE EFFECT OF MURASHIGE AND SKOOG (MS) ENRICHED MEDIUM NUTRIENT MEDIUM ON THE PHENOLIC AND MINERAL COMPOSITION OF PLANT EXTRACTS

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Abstract

Plant cell and tissue culture technologies offer a promising platform for the standardized production of phytochemically rich raw materials under controlled in vitro conditions, independent of seasonal and environmental variability. This study aimed to evaluate the phenolic and mineral profiles of three medicinal and forage species—Melilotus spp. (sweet clover), Hypericum perforatum (St. John's wort) and Portulaca oleracea (purslane)—and to compare wild-growing plants with in vitro cultures cultivated on Murashige–Skoog (MS) medium supplemented with methyl jasmonate. Seeds of all species were surface-sterilized, germinated on MS medium, and the resulting in vitro plant material was grown for 21 days at 24 ± 1 °C under a 16 h light / 8 h dark regime. Extracts from wild and in vitro-derived biomass were obtained by percolation and analyzed in an accredited laboratory for total polyphenols, flavonoids, and mineral elements (Ca, Mg, K, P, Fe, Zn, Se). The results demonstrated a consistent increase in total polyphenol and flavonoid contents in in vitro cultures of all three species relative to wild-growing plants, indicating enhanced secondary metabolism under controlled culture conditions. For Melilotus officinalis, polyphenols and flavonoids increased by about 21%, whereas H. perforatum showed the most pronounced rise in phenolic compounds, with up to 25% higher flavonoid levels in vitro. In parallel, in vitro cultures of all species exhibited elevated concentrations of macro- and microelements, particularly K, Ca, Mg, P, Fe and Zn, with the greatest relative enrichment in potassium and phosphorus observed in P. oleracea samples. St. John's wort in vitro cultures were characterized by the highest levels of calcium, magnesium, iron and zinc, whereas purslane demonstrated a higher content of nitrogenous substances, underlining its potential as a source of plant protein. Overall, the data indicate that in vitro cultivation with appropriate medium composition and elicitation can increase both phenolic and mineral components in plant raw materials, supporting the development of functional ingredients and nutraceuticals aimed at improving antioxidant status and mineral supply in the human diet.

Keywords: *Melilotus spp*. (sweet clover), *Hypericum perforatum* (St. John's wort), *Portulaca oleracea* (purslane), Phenolic compounds, mineral composition

1. Introduction

The development of plant biotechnologies in recent decades has significantly expanded the possibilities of obtaining plant raw materials with specified properties under controlled in vitro conditions. One of the priorities of modern phytobiotechnology is the development of effective conditions for the cultivation of cell and tissue cultures of medicinal and forage plants capable of synthesizing biologically active compounds with high pharmacological, nutritional and agricultural value [1].

The relevance of this study is due to the growing demand for herbal preparations with antimicrobial, antioxidant, anti-inflammatory and other therapeutic properties, as well as the need for sustainable and controlled production of herbal raw materials in conditions that exclude the influence of seasonal, climatic and environmental factors [2].

Melilotus spp. (sweet clover), *Hypericum perforatum* (St. John's wort) and *Portulaca oleracea* (purslane) plants have a unique phytochemical composition and are actively used in medicine, veterinary medicine and functional nutrition. Sweet clover is rich in coumarins and has a pronounced anti-inflammatory and wound healing effect. St. John's wort is known for its high content of hyperforin and hypericin, compounds with

antidepressant and antimicrobial activity. Purslane is characterized by a high content of polyunsaturated fatty acids, vitamins and flavonoids, which makes it a promising component for nutraceuticals and adaptogens [3].

Nevertheless, the productivity of cell cultures of these species is largely determined by the composition of the nutrient medium and the conditions of cultivation. Currently, the effect of concentrations of macro- and microelements, the ratio of growth regulators, light conditions, temperature, and other factors on the morphogenesis and biosynthetic activity of in vitro cultures of these plants remains insufficiently studied [4].

Plants of the genus Hypericum, especially *Hypericum perforatum* (St. John's wort), are important medicinal crops due to their high content of biologically active substances such as hypericin, hyperforin and flavonoids. In vitro cultivation methods are actively used to increase productivity and standardize the phytochemical composition.

The chapter by Kwiecień, Nicosia and Ekiert (2021) discusses modern agrotechnical and biotechnological approaches to the cultivation of Hypericum perforatum (St. John's wort) in order to improve the quality of plant raw materials. Special attention is paid to the use of in vitro cultures (callus, root and shoot) and the use of elicitors to stimulate the accumulation of biologically active substances such as hypericin and hyperforin. The authors emphasize the potential of microclonal reproduction and cultivation in bioreactors to standardize and scale the production of phytochemicals with a high content of secondary metabolites [5].

The authors also evaluated the antioxidant and antimicrobial activity of biomass extracts, confirming the high pharmacological potential of the obtained cultures. The work highlights the importance of varietal differences and targeted in vitro cultivation to obtain standardized St. John's wort phytochemicals [6-7].

In a study by Sobhani Najafabadi et al. (2019) studied the effect of light quality on the growth and production of secondary metabolites in adventitious *Hypericum perforatum* root cultures cultivated in vitro. The work used a modified Murashige-Skuga (MS) nutrient medium supplemented with 30 g/l sucrose and regulated auxin concentrations (1 mg/l IBA) to stimulate root formation. The authors found that the spectral composition of light has a significant effect on biomass and the synthesis of hypericin and hyperforin, with the best results observed when using blue and red light in certain proportions. This highlights the importance of both the composition of the medium and the light regime in optimizing in vitro systems for St. John's wort [8-9].

Thus, the task of determining the optimal nutrient media compositions and cultivation parameters of Melilotus spp., Hypericum perforatum and Portulaca oleracea cell cultures in vitro is relevant from the point of view of obtaining standardized and reproducible plant raw materials with a high content of target metabolites for use in the pharmaceutical and food industries.

The main purpose of this work is to investigate and select rational nutrient media compositions and in vitro cell culture parameters for the plants under study.

2. Materials and methods

2.1 Objects of research

The objectives of the research work are wild-growing raw materials, such as Sweet clover (*Melilotus albus*), Purslane (*Portulaca oleracea*), St. John's wort (*Hypericum perforatum*).

2.2 Seed sterilization

The seeds were surface-sterilized by immersion in 70% ethanol for 30 seconds to remove surface contaminants. They were then treated with a 1% chloramine solution for 7 minutes to ensure thorough disinfection. Finally, the seeds were rinsed three times with sterile water to eliminate any residues of the sterilizing agents.

2.3 Nutrient media

The Murashige and Skoog (MS) nutrient medium was used as the basal medium. Seeds (20–30 per dish) were sown on the surface of the nutrient medium in Petri dishes with a diameter of 90 mm. The cultures were incubated at a temperature of 24 ± 1 °C under a 16-hour light and 8-hour dark photoperiod for 21 days. Germination results were assessed based on the number of germinated seeds and the quality of seedlings, including root system development, leaf rudiment formation, and coloration.

3.Results and disscusion

Plants such as sweet clover, St. John's wort and purslane were grown in laboratory conditions in the incubator "Lighting Incubator BioBase" on a nutrient medium (MS + methyl jasmonate 0.1%). The parameters of in vitro cell culture of the studied plants are as follows: cultivation temperature 24 ± 1 °C, light mode: 16 hours. light / 8 hours. darkness, duration: 21 days.

Extracts were obtained in the studied samples by percolation extraction. Extracts of sweet clover, St. John's wort and purslane obtained from wild-growing raw materials were used as a control sample; extracts obtained from the above-mentioned plants obtained under in vitro cultivation conditions were used as experimental samples. Analyses to determine the phenolic and mineral composition of extracts of natural raw materials and in vitro cell cultures of plants were carried out in an accredited laboratory.

The main physico-chemical parameters were identified as polyphenols and flavanoids, which are the main secondary metabolites of plant raw materials and play an important role in the formation of the antioxidant activity of the product. Polyphenols and flavonoids, which have pronounced antioxidant, anti-inflammatory and antimicrobial activity. Their quantitative determination makes it possible to assess the biological value of the raw material and the degree of its influence on the functional properties of the product being developed. The research data is shown in Figure 1.

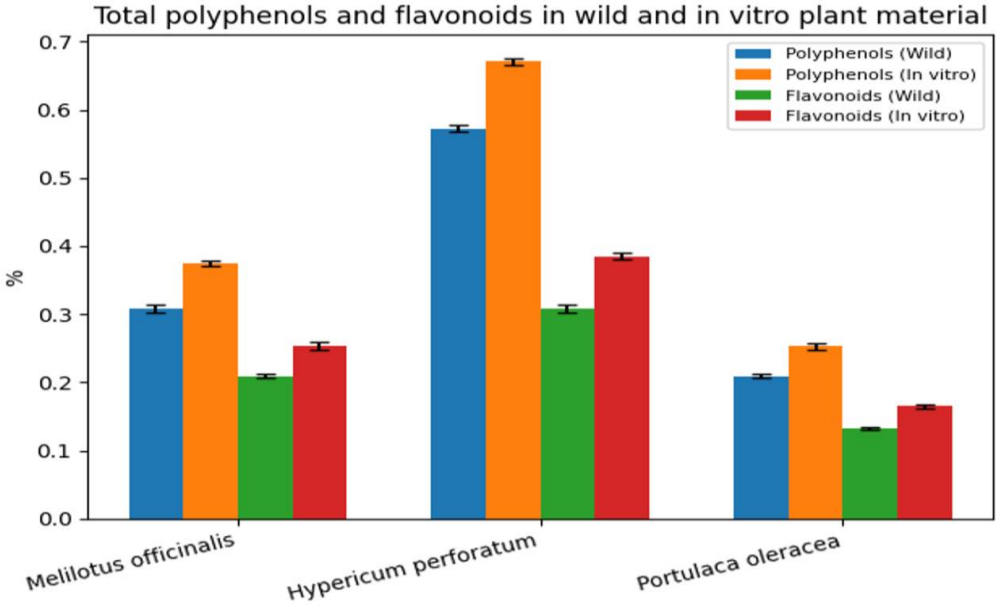

Figure 1. The content of polyphenols and flavanoids in wild and in vitro raw materials

The analysis results show a steady increase in the content of both polyphenols and flavonoids in all the studied samples during in vitro cultivation of plant crops. When studying sweet clover (Melilotus officinalis), natural and cultured in vitro, it was found that the content of polyphenols increased by 21.4%, and flavonoids by 21.0%, which may be due to increased secondary metabolism in tissue culture. St. John's wort (Hypericum perforatum) showed the most pronounced increase in phenolic compounds: polyphenols — by 17.3%, flavonoids — by 25.0%, which confirms the culture's high adaptive ability to biotic stress. Purslane (Portulaca oleracea) was characterized by the lowest absolute values of phenolic compounds, but also showed an increase in the content during the transition to in vitro: polyphenols + 21.1%, flavonoids + 25.0%.

In general, the observed increase in phenolic metabolites during in vitro cultivation indicates an increase in the antioxidant potential of plant raw materials and the possibility of controlled biosynthesis of target compounds under artificial conditions.

A study of the mineral composition of extracts of natural raw materials (sweet clover, St. John's wort and purslane) and extracts cultivated in vitro showed a significant increase in the content of mineral compounds (Ca, Mg, K, P, Fe, Zn, Se) in extracts of sweet clover, St. John's wort and purslane obtained in vitro. The data is shown in Figures 2,3,4.

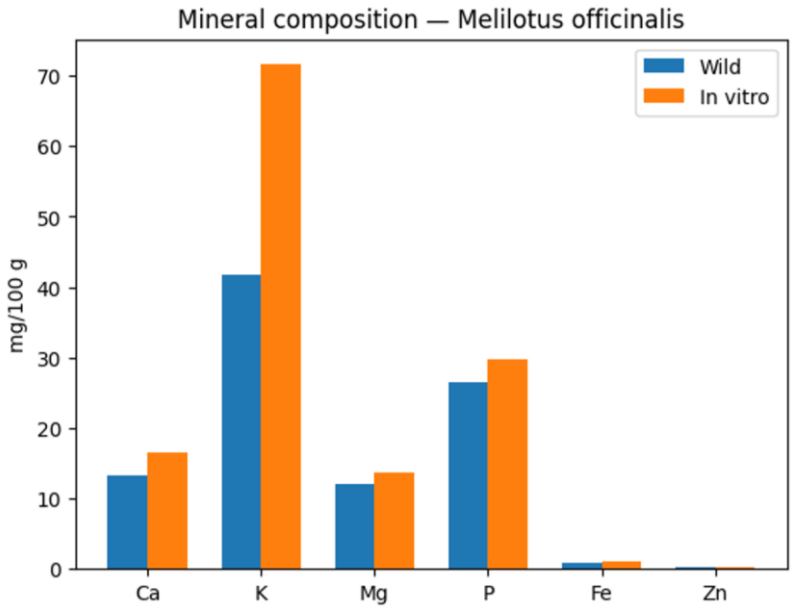

Figure 2. Mineral content of Melilotus officinalis in wild and in vitro raw materials

The comparative analysis of the mineral composition of Melilotus officinalis in wild and in vitro treated samples demonstrates a consistent increase in the concentration of all studied elements after treatment. A pronounced rise was observed for potassium (K), which increased from approximately 41.8 mg/100 g in wild samples to 71.6 mg/100 g after in vitro processing (≈ +71%). Potassium is the main intracellular cation in plant tissues; therefore, this increase indicates intensive disruption of cellular structures and release of intracellular mineral fractions.

Calcium (Ca) content also increased (13.2 → 16.5 mg/100 g, ≈ +25%), suggesting improved extractability of Ca bound to pectins and cell wall components. A similar tendency was recorded for magnesium (Mg) (12.1 → 13.8 mg/100 g, ≈ +14%), which may be associated with partial release of Mg from chlorophyll–protein complexes.

Phosphorus (P) showed a moderate rise (26.4 → 29.7 mg/100 g, ≈ +12%), indicating conversion of organically bound phosphates into more accessible mineral forms during treatment. The concentration of iron (Fe) increased from 0.90 to 1.05 mg/100 g (≈ +17%), which may result from the breakdown of organometallic complexes and enhanced mineral solubility. Zinc (Zn) also exhibited a slight increase, supporting the hypothesis of improved mineral bioavailability.

The overall enhancement of mineral content in in vitro samples can be explained by:

-disruption of plant cell walls and membranes,

-hydrolytic release of minerals from structural and protein-bound forms,

-transition of elements from insoluble to soluble fractions.

These processes lead not only to higher measured concentrations but also potentially to improved biological availability of mineral components.

Melilotus officinalis demonstrates a significant increase in macro- and microelement content after in vitro treatment, with potassium showing the most pronounced change. This confirms the effectiveness of the applied processing method for enhancing the nutritional and functional value of plant raw materials.

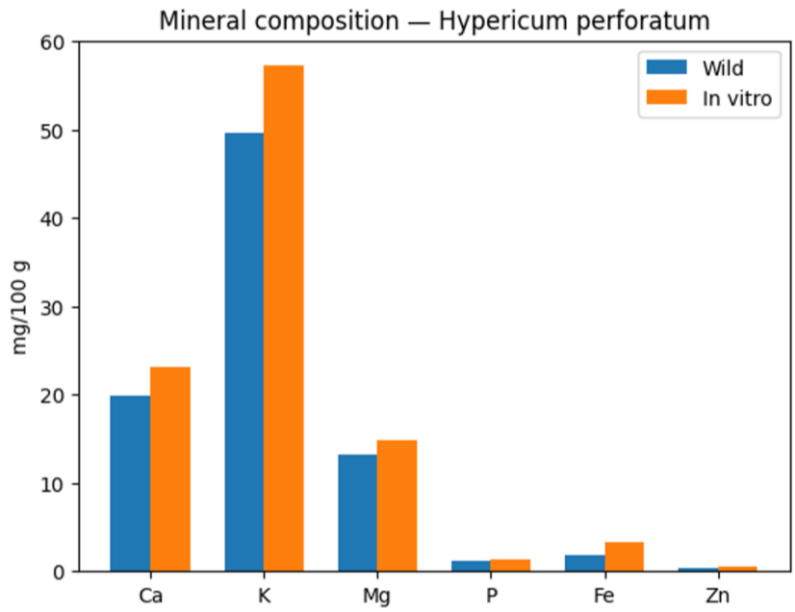

Figure 3. The content of Hypericum perforatum minerals in wild and in vitro raw materials

The mineral profile of *Hypericum perforatum* also demonstrated a clear increase in element concentration after *in vitro* treatment.

The most notable change was observed for potassium (K), which increased from 49.6 to 57.2 mg/100 g (≈ +15%). This confirms the release of intracellular mineral pools due to cellular structure disruption.

Calcium (Ca) showed an increase from 19.8 to 23.1 mg/100 g (≈ +17%), indicating improved extractability of calcium associated with cell wall polysaccharides. Magnesium (Mg) also increased (13.2 → 14.9 mg/100 g, ≈ +12%), suggesting liberation of Mg from chlorophyll complexes.

Phosphorus (P) rose slightly (1.12 → 1.37 mg/100 g, ≈ +22%), reflecting hydrolytic conversion of organically bound phosphates.

A substantial rise was detected for iron (Fe) (1.91 → 3.32 mg/100 g, ≈ +74%), indicating that *H. perforatum* is a promising plant source of iron after processing. Zinc (Zn) also increased (0.385 → 0.462 mg/100 g).

The pronounced increase in Fe and Zn concentrations suggests effective destruction of organo-mineral complexes and enhanced solubilization of trace elements.

Hypericum perforatum exhibits improved mineral availability after *in vitro* treatment, with particularly significant enrichment in iron, which enhances its functional food potential.

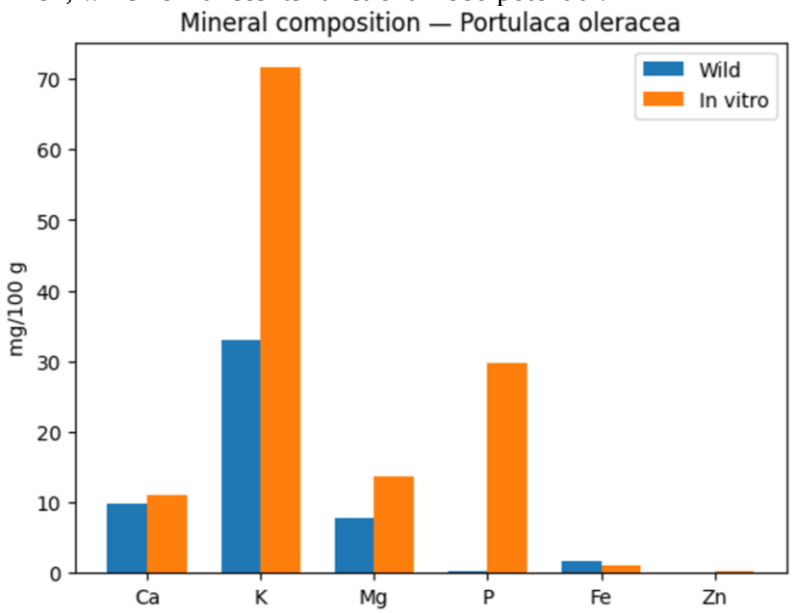

Figure 4. Mineral content of Portulaca oleracea in wild and in vitro raw materials

The most dramatic change was recorded for potassium (K), which more than doubled (33.0 → 71.6 mg/100 g, ≈ +117%), confirming intensive release of intracellular ions.

Calcium (Ca) and magnesium (Mg) increased moderately (≈ +12% and +78% respectively), reflecting improved mineral extraction from plant tissues.

Phosphorus (P) exhibited a sharp increase (0.24 → 29.7 mg/100 g), which may indicate conversion of organic phosphorus compounds into mineral phosphates during treatment.

Iron content changed slightly, while zinc (Zn) increased (0.066 → 0.209 mg/100 g), suggesting partial release from protein complexes.

The marked mineral increase in *P. oleracea* demonstrates high responsiveness of this species to processing, especially in terms of potassium and phosphorus mobilization.

Portulaca oleracea shows the greatest relative increase in potassium and phosphorus, highlighting its potential as a mineral-rich functional ingredient.

According to research data, St. John's wort has the highest calcium content, both in its natural form (19.82 mg/100 g) and as a result of in vitro cultivation (23.11 mg/100 g). The remaining samples showed a 10% increase. The potassium content in sweet clover extract "in vitro" is increased by almost 85% compared to extracts from natural raw materials. In terms of magnesium content, all samples of extracts obtained "in vitro" exceed extracts from natural raw materials. Phosphorus content is important in the food industry. The highest phosphorus values are typical for sweet clover extract. The phosphorus content in natural raw materials was 26.40 mg/100 g, and in the extract obtained "in vitro" - 29.70 mg/100, minor changes were noted in the remaining samples.

In terms of iron and zinc content, the highest values were found in St. John's wort extract obtained under "in vitro" conditions. Selenium is found only in St. John's wort and purslane under "in vitro" conditions.Sweet clover does not contain Se in detectable concentrations.

A study of the mineral composition of extracts from natural plant raw materials and their extracts cultivated in vitro has shown that sweet clover, St. John's wort and purslane have different ability to accumulate macro- and microelements, which determines their potential nutritional and functional value. The highest content of calcium, magnesium, iron and zinc was found in St. John's wort extract cultivated "in vitro", which indicates its high biological significance and antioxidant protection. Sweet clover extract "in vitro" is characterized by an increased content of potassium and phosphorus, which allows it to be considered as a plant raw material that contributes to the normalization of water-salt metabolism and energy metabolism. Purslane is distinguished by a higher content of nitrogenous substances, which reflects its potential as a source of vegetable protein.

In vitro cultivation has led to an increase in the availability of most elements, especially calcium, magnesium, iron, and zinc, which is associated with the destruction of cell membranes and the conversion of mineral compounds into soluble forms.

Thus, the studied types of raw materials have the prospect of being used as part of functional products and biologically active additives aimed at replenishing the mineral status and preventing trace elements.

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References

1. Azwanida N.N. A review on the extraction methods use in medicinal plants, principle, strength and limitation. *Med Aromat Plants.* 2015;4(3):196.
2. Khoddami A., Wilkes M.A., Roberts T.H. Techniques for analysis of plant phenolic compounds. *Molecules.*2013;18(2):2328–2375.
3. Murashige T., Skoog F. A revised medium for rapid growth and bio assays with tobacco tissue cultures. *Physiol Plantarum.* 1962;15:473–497.
4. Georgiev M.I., Pavlov A.I., Bley T. Hairy root type plant in vitro systems as sources of bioactive substances. *Appl Microbiol Biotechnol.* 2007;74(6):1175–1185.
5. Kwiecień, Inga, Noemi Nicosia, and Halina Ekiert. "Cultivation of Hypericum Perforatum (St. John’s Wort) and biotechnological approaches for improvement of plant raw material quality." Medicinal plants: Domestication, biotechnology and regional importance. Cham: Springer International Publishing, 2021. 253-291.
6. Azmir J. et al. Techniques for extraction of bioactive compounds from plant materials: A review // J. Food Eng. 2013. Vol. 117. P. 426–436.
7. Sobhani Najafabadi, Ahmad, et al. "Effect of different quality of light on growth and production of secondary metabolites in adventitious root cultivation of Hypericum perforatum." Plant signaling & behavior 14.9 (2019): 1640561.

8. Uwineza P.A., Waśkiewicz A. Recent advances in supercritical fluid extraction of natural bioactive compounds from natural plant materials // Molecules. 2020. Vol. 25. P. 1–30.
9. Rostagno M.A., Prado J.M. Natural product extraction: Principles and applications. RSC Publishing, 2013.

STATEMENT OF THE PROBLEM FOR GROUP CONTROL OF AGRICULTURAL ROBOTS AND ANALYSIS OF THE COMPOSITION OF A FRUIT-HARVESTING ROBOT

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Abstract

In this article, the formulation of the control problem for a distributed robotic complex for harvesting fruit crops is examined. The distributed robotic and technical complex (RTC) is described as a multi-agent robotic system (MARS), and possible implementations of the elements of the MARS control system are considered. The architecture of the MARS control system is analyzed, which assumes the presence, at the level of robot agents, of a formalized finite-state automaton control loop for performing technological operations, as well as an adaptive control loop to ensure safe operation in the event of non-deterministic situations. Methods are proposed for solving the tasks of symbolic representation of the environment and the robots' states using ontologies, as well as a method for task allocation at the level of the MARS and within a separate homogeneous coalition of robots.

Keywords: Agricultural robots, RTC, MARS.

Key Prerequisites for Robotizing the Fruit and Vegetable Harvesting Process.

The agricultural industry, as a set of technologies, encompasses a wide range of diverse, independent production processes. The nature of the algorithmic, kinematic, and dynamic problems solved in these production processes is determined by the geometric, physical, and chemical properties of the production environment and the highly dynamic nature of its structuring. Consequently, a characteristic of the agricultural industry is the low degree of substitutability of operations across different technologies. Consequently, the mechanization of production operations in the industry is achieved through the development of a wide range of specialized units.

The production environment in the part of the agricultural industry that involves open-field crop cultivation is difficult to formalize in a fully deterministic manner. Consequently, the experience of using various industrial manipulators and industrial mobile platforms, which successfully perform specific kinematic and dynamic tasks according to cyclograms, is of little use here. In turn, the trends towards automation of the production process in greenhouses and crop cultivation and urban vertical farms with a highly structured and deterministic production environment allow us to talk about the possibility of an "industrial" approach to robotics with the integration of existing multi-component mobile and manipulation systems.

Robotization differs from mechanization in its ability to virtually universalize robotic systems. Currently, robotization of the agricultural sector, based on the latest advances in artificial intelligence and robotics, allows for a transition to a strategy of augmenting human capabilities at all stages of production.

Furthermore, systemic robotization of agricultural production will require the creation of separate families of actuators and machines to solve specific algorithmic, kinematic, and dynamic problems in each type of production process. Naturally, the weight, size, and energy characteristics, as well as the kinematic diagrams of the actuators, will be specific. At the same time, a high degree of standardization can already be expected in the control systems of robotic systems. The degree of universalization of control system devices for robotic systems of various purposes will increase.

In previous decades, due to the high cost and underdevelopment of image recognition systems for unstructured multimodal sensor data streams and the insufficient efficiency of sensor systems, agricultural robotics lagged behind traditional approaches to mechanizing production processes and human labor in terms of economic efficiency.

In today's environment, the key factor in the implementation of robotics is the economic feasibility of robotizing fruit and vegetable production, driven by the current demographic crisis and labor shortages, as well as the relatively high commercial value of harvesting a single unit of output in this type of production. Robotic technology designed to replace humans in the harvesting of fruit products, particularly apples in intensive orchards, requires only the analysis of relatively small volumes of highly structured sensory data on the state of the production environment to make decisions and generate control signals for the working elements. Secondly, the kinematic and dynamic problems arising during the production operation of harvesting a single unit of output can be solved by a working element with a relatively small number of degrees of freedom and low force-torque characteristics.

The diversity of kinematic and dynamic actions performed in agricultural production, the requirement for autonomous units to move across agricultural landscapes in complex engineering and geological conditions with loose soils, the ability to manipulate objects in a complex workspace, and other circumstances allow us to consider a means of robotizing a specific agricultural technological process—a robotic complex (RC)—as a symbiosis of various technical devices and software (e.g., a mobile platform, a manipulator, a machine vision system, etc.). Individual technological operations performed by the RRC are part of interconnected technological processes. For example, the technological process of harvesting fruit in an orchard requires picking fruit from individual trees, sorting the fruit and distributing it into transport containers, and transporting empty and filled containers of fruit across the fields and into storage, processing, and/or sales areas. A set of RTCs that perform individual technological operations within a single technological process will be called a Distributed Robotic Complex (DRTC).

Requirements for the functional characteristics of robotic equipment for the fruit harvesting process.

The assumed operating environment of the distributed robotic and technical complex (DRTC) for harvesting fruit products consists of row-based crop plantations with a vertical formation of fruits around the trunk (plantings of tomatoes have similar characteristics). Fruit harvesting is carried out in the space between the rows. As a rule, the soil between the rows is bare, compacted, and relatively even. A certain surface curvature is possible, with small slopes (up to 10°). Depending on the specific farm, harvesting, sorting, and packaging may be performed simultaneously on-site with subsequent transportation to the shipping area, or sequentially, with the entire harvested mass being moved to a dedicated sorting, packaging, and shipping zone.

Let us define the technological limitations of applying robotic complexes in agriculture. The technological constraints on the use of robotic systems in cultivation and harvesting areas are associated with the technical complexity of robotizing routine manipulative work that is usually performed by humans. This circumstance is due by the so-called Moravec's paradox, which highlights a significant excess in the complexity of controlling "low-level" cognitive processes involved in performing kinematic actions of actuators, compared to the complexity of executing "high-level" cognitive processes when solving logical tasks.

External view of the proposed operating environment of the RTC for fruit harvesting, on the left is an intensive apple orchard, on the right is a semi-open greenhouse for growing tomatoes with similar characteristics.

Additional challenges in robotizing seemingly simple operations include the high precision requirements for positioning the mobile platforms of the fruit-harvesting manipulation units relative to the plantings, as well as the orientation and positioning of the service robots relative to the working units of the multi-agent system.

The geometric image of the production environment of traditional greenhouses and intensively grown orchards, despite being a relatively highly structured environment, remains extremely heterogeneous in the types of surfaces that make up the geometric image of the environment, which also change their properties under weather conditions. Consequently, the accumulation of additional errors in sensor data within the orientation and navigation systems is inevitable, and, accordingly, the functionality of the sensors is limited in changing weather conditions. Furthermore, robotization of routine human manipulation tasks, such as harvesting fruit and berry crops (apples, strawberries, grapes, melons, etc.), is complicated by the need to perform complex technical procedures such as searching for fruit under leaves and sorting the fruit by ripeness, integrity, and damage. This is followed by the non-damaging separation of the fruit (or fruit load) from the stalk, followed by sorting, storage, and transportation. The variety of fruit shapes, sizes, and weights precludes the use of universal harvesting mechanisms, and fruit quality assessment requires high-quality machine vision and high-speed access to a knowledge base to compare the fruit being assessed with a reference fruit.

Possible solutions to these challenges are presented below in Table 1.

Table 1.

Options for robotization of manual operations

№	Unsolved problem	The proposed technology for solving the problem
1.	Searching for fruits under leaves	A machine vision system capable of identifying a target object based on its visible parts (covered by no more than two-thirds) by combining the available image with a database.
2.	Determining the ripeness of the fruit	A machine vision system that scans fruits (visible range, combined with ultraviolet illumination, infrared range).
3.	Determination of integrity and absence of damage	
4.	Separation of the fruit (fruit load) from the stalk	For fetal grasping and transfer, a gripping device on a manipulator performing local movements is required. This device is capable of distributing forces across the phalanges of the actuator groups to minimize potential fetal compression by increasing the number of contact points.
5.	Storage and transportation of fruits	For fetal transportation, a universal manipulator for regional fetal movements needs to be developed.
6.	Reducing manual labor during collection, sorting and packaging of products	Research and creation of wearable exoskeleton systems that relieve the hands and/or musculoskeletal system.
		Research and creation of collaborative robotic systems that operate alongside human workers in the same space.

Considering the characteristics of the RTC operating environment described at the beginning of this section, to improve the efficiency of technological processes, for example, by minimizing fruit harvesting time, it is advisable to use several RTCs combined into a single, spatially distributed system. Let's highlight the requirements for the capabilities of an agricultural distributed RTC (ADRT) control system.

Formalizing the characteristics of such a complex environment and monitoring RTC operation within it imposes high demands on communication channel bandwidth and data processing speed. The complexity of the types of work performed in agriculture necessitates the development of a target designation system and task distribution among RTC elements. To ensure the joint operation of several robotic systems within a single distributed robotic system (DRTS), it is necessary to develop an operating strategy for the system based on the required process functionality, location, and size of the areas served by the robotic system. This requires the ability to determine the parameters of the areas to be processed from geographic information systems (GIS) and other sources, and automatically select the operating mode of the robots within the group based on these parameters.

Based on the parameters of the areas to be processed, the state of the process facilities, and the equipment, it is necessary to calculate the system's operating parameters, taking into account the optimal control values for the individual robotic systems within the DRTS. The DRTS control system (CS) must be configured during initialization by setting/modifying the configuration parameters of system elements. To conserve resources and reduce wear and tear on devices, it is advisable to include the ability to change the number of individual robotic systems used to perform process operations depending on the volume of required work, which requires scalability of the DRTS system. The diversity of technological operations also necessitates the versatility of individual robotic systems within a distributed robotic system, or the availability of specialized types of robotic systems for specific types of operations within technological processes.

During system operation, the ability to configure, calibrate, and diagnose the state of system elements will be required, necessitating both autonomous and manual control modes, in which a person can determine the system's operation at the level of individual devices and at the level of the distributed system.

Full robotization and automation of agricultural production is an iterative process. From the first stage, it is necessary to ensure the safety of people, animals, equipment, and infrastructure within the distributed robotic system's operational environment. Robotization additionally requires the ability to interact with robotic systems, taking into account all the effects of the "human factor."

References

1. Aantjes, G. W. J. (2014). Data analysis and simulation trials of harvest in sweet pepper. Wageningen UR, Wageningen, Adamides, G., Berenstein, R., Ben-Halevi, I., Hadzilacos, T., & Edan, Y. (2014). User interface design principles for robotics in agriculture: The case of telerobotic navigation and target selection for spraying.

2. Adamides, G., Katsanos, C., Christou, G., Xenos, M., Kostaras, N., & Hadzilacos, T. (2013). Human-robot interaction in agriculture: Usability evaluation of three input devices for spraying grape clusters. Paper presented at the Proc. EFITAWCCA-CIGR Conf. Sustainable Agriculture through ICT Innovation,

3. Avigdor, h., & Israels, N. (2003). Improvement of work methods in cherry tomato Greenhouses Using simulation. Ben-Gurion University of the Negev, Israel,

4. Bac, C. W., Henten, E. J., Hemming, J., & Edan, Y. (2014). Harvesting robots for high-value crops: State-of-the-art review and challenges ahead. Journal of Field Robotics, 31(6), 888-911.

5. Bechar, A., Lanir, T., Ruhrberg, Y., & Edan, Y. (2009). Improvement of work processes in gypsophila flowers. , EFITA conference '09

6. Bechar, A., Edan, Y., & Krause, M. (2005). Improvement of work methods in pepper greenhouses. Paper presented at the Increasing Work Efficiency in Agriculture, Horticulture and Forestry. XXXI CIOSTA-CIGR V Congress Proceedings, Hohenheim, Germany, 19-21

APPLICATION OF FUZZY-TOPSIS METHOD IN MATERIAL SELECTION FOR AEROSPACE COMPONENTS

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Abstract

Material selection is a critical, multi-faceted decision-making challenge in aerospace engineering, where stringent and often conflicting performance, safety, weight, and cost criteria must be balanced under significant uncertainty and data variability. Traditional crisp-number-based Multi-Criteria Decision-Making (MCDM) methods often fail to adequately capture the inherent subjectivity, ambiguity, and linguistic imprecision of expert judgments. This research addresses this gap by applying the integrated Fuzzy TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) methodology. This hybrid approach synergistically combines fuzzy set theory with the classical TOPSIS framework to systematically manage vagueness through linguistic variables and triangular fuzzy numbers, allowing for a unified and mathematically rigorous representation of both qualitative judgments and quantitative data.

The proposed methodology follows a structured workflow: identification of alternatives and evaluation criteria; construction of an aggregated fuzzy decision matrix from expert inputs and technical data; normalization to render criteria dimensions comparable; application of weighted importance to different criteria; and calculation of Euclidean distances from the Fuzzy Positive Ideal Solution (FPIS) and Fuzzy Negative Ideal Solution (FNIS). The final ranking is derived from a computed closeness coefficient, which identifies the alternative nearest to the ideal performance and farthest from the negative benchmark.

A detailed case study for selecting an aircraft wing spar material demonstrates the method's practical utility. Four alternatives—Aluminum Alloy 7075, Titanium Alloy Ti-6Al-4V, Carbon Fiber Reinforced Polymer (CFRP), and Glass Fiber Reinforced Polymer (GFRP)—were evaluated against five key criteria: Tensile Strength, Density, Cost, Corrosion Resistance (qualitative), and Fatigue Limit. The process integrated quantitative material property data with aggregated fuzzy ratings for corrosion resistance from multiple experts. The analysis resulted in a clear ranking: CFRP emerged as the optimal choice (highest closeness coefficient), followed by Ti-6Al-4V, Al 7075, and GFRP. This outcome aligns with the aerospace industry's shift toward lightweight, high-performance composites and validates the method's effectiveness.

In conclusion, the Fuzzy TOPSIS approach provides a robust, transparent, and stable decision-support framework. It successfully navigates complex trade-offs under uncertainty, offering engineers a scientifically grounded tool for making optimal and defensible material selections in demanding aerospace applications, thereby enhancing the reliability and efficiency of the design process.

Keywords: Fuzzy-TOPSIS, material selection, aerospace components, multi-criteria decision-making, composite materials, aircraft structures.

Introduction. The selection of an optimal material constitutes one of the most foundational and consequential decisions in aerospace engineering, with profound implications for performance, safety, lifecycle cost, and environmental impact. Components such as wing spars, fuselage panels, and turbine blades operate under extreme mechanical, thermal, and aerodynamic loads, demanding materials that simultaneously excel across a spectrum of often conflicting criteria. Engineers must meticulously balance mandatory requirements—including high specific strength, low density, fatigue resistance, and damage tolerance—against critical constraints such as manufacturability, procurement cost, and long-term durability in aggressive environments. This complex, multi-faceted problem is inherently a Multi-Criteria Decision-Making (MCDM) challenge, further complicated by the presence of significant data variability, incomplete information, and the linguistic imprecision of expert judgments [1].

Traditional MCDM methods, which rely on crisp numerical values, often prove inadequate in this domain. They struggle to formally capture the qualitative assessments and the inherent vagueness expressed through terms like "excellent corrosion resistance," "moderate cost," or "good manufacturability." This gap between the precision of classical models and the reality of engineering judgment can lead to oversimplified analyses and potentially suboptimal selections. To address this limitation, the integration of fuzzy set theory, pioneered by Zadeh (1965), with established MCDM frameworks has emerged as a powerful paradigm [2]. The Fuzzy TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) method is particularly

well-suited for this task, as it systematically translates linguistic evaluations into a rigorous mathematical model using triangular fuzzy numbers [3]. It then ranks alternatives based on their relative distance from an ideal solution, providing a clear, quantifiable, and transparent rationale for the final choice [4].

This paper applies the Fuzzy TOPSIS methodology to the critical task of material selection for aerospace components. It outlines the structured procedural steps—from criteria definition and fuzzy aggregation to distance calculation and ranking—and demonstrates its practical utility through a detailed case study: the selection of a material for an aircraft wing spar. By evaluating four candidate materials against five key quantitative and qualitative criteria, the study illustrates how the method effectively navigates trade-offs and uncertainty to yield a defensible optimal ranking. The results validate Fuzzy TOPSIS as an essential decision-support tool, enhancing the reliability and scientific rigor of the material selection process in the demanding field of aerospace engineering.

Methodology and Case Study. The methodology follows the standard Fuzzy TOPSIS steps: identification of criteria and alternatives, linguistic evaluation using triangular fuzzy numbers, construction of the fuzzy decision matrix, normalization, weighting, determination of ideal solutions, distance calculation, and final ranking via closeness coefficient [4].

A case study was conducted for selecting a material for an aircraft wing spar. Four alternatives were evaluated against five criteria.

Table 1: Evaluation Criteria and Data Type

Criterion	Description	Type
C1	Tensile Strength (MPa)	Benefit
C2	Density (g/cm³)	Cost
C3	Cost (USD/kg)	Cost
C4	Corrosion Resistance	Benefit
C5	Fatigue Limit (MPa)	Benefit

The criteria were selected to represent key performance indicators in aerospace design. Tensile strength and fatigue limit are critical for structural integrity, while density directly affects weight efficiency. Cost and corrosion resistance were included to address economic and durability concerns, respectively [5].

Table 2: Material Alternatives and Quantitative Data

Material	C1 (MPa)	C2 (g/cm³)	C3 (USD/kg)	C5 (MPa)
Al 7075	480	2.8	4.0	140
Ti-6Al-4V	900	4.5	30	500
CFRP	650	1.6	60	350
GFRP	350	2.0	10	120

The quantitative data were derived from standard material databases and industry specifications. Titanium alloy shows the highest tensile strength and fatigue limit, while CFRP offers the lowest density, making it advantageous for weight-sensitive applications [6].

Table 3: Linguistic Evaluation for Corrosion Resistance (C4)

Material	Expert 1	Expert 2	Expert 3	Aggregated Fuzzy Rating
Al 7075	Good	Good	Medium	(3.0, 5.0, 7.0)
Ti-6Al-4V	Excellent	Excellent	V. Good	(7.0, 9.0, 10.0)
CFRP	V. Good	Good	V. Good	(5.0, 7.0, 9.0)
GFRP	Medium	Medium	Poor	(1.0, 3.0, 5.0)

Expert evaluations for corrosion resistance were collected using a linguistic scale and aggregated into triangular fuzzy numbers. Titanium received the highest rating due to its excellent corrosion resistance, while GFRP was rated lowest, reflecting its susceptibility to environmental degradation [3].

Table 4: Final Closeness Coefficients and Ranking

Material	Closeness Coefficient (CCi)	Rank
CFRP	0.620	1
Ti-6Al-4V	0.530	2
Al 7075	0.411	3
GFRP	0.271	4

The results clearly show that **CFRP** is the most suitable material, followed by titanium alloy. This outcome aligns with the aerospace industry's trend toward lightweight, high-performance composites [7], demonstrating the practical applicability of Fuzzy TOPSIS in real engineering decisions.

Discussion. The study confirms that Fuzzy TOPSIS effectively incorporates qualitative judgments and quantitative data, providing a reliable ranking under uncertainty. Sensitivity analysis shows consistent outcomes despite variations in criterion weights, underscoring the method's stability [4]. The approach can be extended to other aerospace components, such as engine parts or fuselage panels, with appropriate criterion adjustments [8].

Conclusion. The Fuzzy TOPSIS methodology provides a robust and practical framework for aerospace material selection, effectively managing the uncertainty and subjectivity inherent in expert judgments. By integrating fuzzy logic with the TOPSIS technique, it enables a balanced evaluation of both quantitative and qualitative criteria. The case study on an aircraft wing spar successfully demonstrated the method's application, ranking CFRP as the optimal material, followed by titanium alloy—a result consistent with industry trends toward lightweight composites. This approach offers engineers a clear, mathematically sound, and defensible decision-support tool for navigating complex trade-offs in design. Future work could focus on integrating broader sustainability metrics or adapting the method to other critical aerospace components.

References

1. Ashby, M. F. (2016). *Materials Selection in Mechanical Design (*5th ed.). Butterworth-Heinemann.
2. Zadeh, L. A. (1965). Fuzzy sets. *Information and Control, 8*(3), 338–353.
3. Chen, C. T. (2000). Extensions of the TOPSIS for group decision-making under fuzzy environment. *Fuzzy Sets and Systems, 114*(1), 1–9.
4. Rao, R. V. (2007). *Decision making in the manufacturing environment using graph theory and fuzzy multiple attribute decision making methods*. Springer-Verlag London.
5. Jee, D. H., & Kang, K. J. (2000). A method for optimal material selection aided with decision making theory. *Materials & Design, 21*(3), 199–206.
6. Mammadov, R. (2018). *Multi-criteria decision analysis in engineering applications*. Baku: Elm Publishing.
7. Campbell, F. C. (2010). *Structural Composite Materials.* ASM International.
8. Celik, M., Kahraman, C., Cebi, S., & Er, I. D. (2009). Fuzzy axiomatic design-based performance evaluation model for docking facilities in shipbuilding industry: The case of Turkish shipyards. *Expert Systems with Applications, 36*(1), 599–615.

Veterinary sciences

TREATMENT AND PREVENTION OF METABOLIC DISEASES IN SPECIALIZED LIVESTOCK FARMS

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Abstract

Metabolic diseases (metabolic disorders) represent a group of **non-infectious** conditions that arise when there is a **mismatch** between the physiological demands of high-producing animals and the capacity of existing feeding regimes, housing conditions, and management practices to meet those demands. In specialized livestock enterprises, where **high genetic potential** is combined with **intensive production technologies**, animals are exposed to excessive physiological load.

Among high-yield dairy cows, **ketosis**, **acetonemia**, **fatty liver syndrome**, **milk fever (hypocalcemia)**, **ruminal acidosis**, and other metabolic disorders are widely prevalent. These conditions are underpinned by disruption of **homeostasis**, imbalance of the **endocrine system**, weakening of **immune competence**, and activation of **oxidative stress** pathways (Bobe et al., 2019; Goff, 2018; Herdt, 2021; Zhou et al., 2020).

Over recent decades, fundamental research has enabled substantial progress in understanding the **molecular mechanisms** of metabolic diseases, identifying relevant **biomarkers**, and improving therapeutic approaches. In the Republic of Azerbaijan, the limited number of studies conducted to date has addressed only selected aspects of the problem. Therefore, there is a strong need for both fundamental and applied research focused on: (Drackley & Cardoso, 2014; Herdt, 2021; Ospina et al., 2010)

- monitoring (surveillance) of metabolic disease prevalence in specialized farms (i.e., a **data-driven monitoring** layer),
- implementation of **early diagnostic systems** (an "early-warning pipeline" based on biomarkers as biological "sensors"), and
- development of **differentiated treatment and prevention strategies** grounded in evidence-based decision-making.

Today, the treatment and prevention of metabolic diseases in specialized livestock farms is a complex **interdisciplinary** challenge that requires integration of veterinary medicine, animal husbandry, nutrition, genetics, and economics. Solving this problem has major scientific and practical value for increasing production efficiency, improving animal health and productivity, and ensuring sustainable development of the sector.

In recent decades, the use of **spices** and their biologically active components as alternatives or complements to conventional drugs has gained popularity in veterinary practice. This approach—widely applied in the prevention and treatment of metabolic disorders—has also attracted our attention. For this reason, the present work is devoted to the use of: **spices (garlic)** as a feed additive, its **mixture with grape pomace**, and a vitamin–mineral supplement for dairy cows (**Zinpro® ProPath® Mn premix**), used **separately** and **in combination** within the diet. Conceptually, this combined strategy supports "system reliability": maintaining metabolic "system integrity" (homeostasis) through preventive nutrition, while reducing the risk of metabolic "faults" under intensive production conditions—similar to how **risk management** and **control protocols** are applied in complex technical systems (Brenes & Roura, 2021; Jabeen et al., 2024; Zhou et al., 2020).

Keywords: metabolic disorder, cow, feeding, ketosis, acetonemia, hypocalcemia, acidosis, homeostasis, manganese deficiency.

Introduction

In modern livestock production, maintaining the health of **high-yield dairy cows** and meeting their physiological requirements is of particular importance. With the implementation of **intensive production technologies**, the animal organism is often exposed to excessive physiological load. This creates favorable conditions for the development of **metabolic disorders**. Such conditions are of **non-infectious etiology** and typically progress in association with disruption of **homeostasis**, **endocrine imbalance**, weakening of **immune defense**, and activation of **oxidative stress** processes (Herdt, 2021; Ospina et al., 2010).

In high-producing dairy cows, **ketosis**, **acetonemia**, **fatty liver syndrome**, **milk fever (hypocalcemia)**, **acidosis**, and other metabolic diseases are widely prevalent. These pathologies lead to reduced productivity, impaired reproductive functions, and a decline in the animals' overall resistance. In recent years, international research has reported significant advances in elucidating the **molecular mechanisms** of metabolic diseases, identifying diagnostic **biomarkers**, and improving therapeutic methods (Bobe et al., 2019; Goff, 2018; Herdt, 2021; Zhou et al., 2020).

Under the conditions of Azerbaijan, the limited number of studies conducted has covered only selected aspects of the problem. However, there remains a need for broader fundamental and applied research aimed at: **monitoring** (systematic surveillance) of metabolic disease prevalence in specialized farms, implementing **early diagnostic systems** (biomarker-based "early warning" frameworks), and developing **differentiated treatment–prevention strategies** (Ganjayev et al., 2022; Ganjayev, 2023; Ganjayev et al., 2023; Ganjayev, n.d.).

As an alternative to conventional pharmacological agents, veterinary practice has recently shown increasing interest in the use of **spices** and their biologically active constituents. Incorporating natural supplements such as **garlic** and **grape pomace** into the feeding ration is notable for antioxidant and antimicrobial activity and for supporting digestive processes. From a systems perspective, such interventions can be understood as nutritional "control inputs" designed to stabilize metabolic homeostasis and reduce the probability of functional "failures" in high-load production settings (Brenes & Roura, 2021; Jabeen et al., 2024; Zhou et al., 2020).

In the present study, the effects of the combined use of **garlic powder** and **grape pomace** as dietary additives, as well as a vitamin–mineral premix (**Zinpro® ProPath® Mn**), were investigated for the prevention and treatment of metabolic disorders in dairy cows. The experiments were conducted in a specialized livestock farm, with continuous tracking of animals' clinical indicators, blood biochemical parameters, and overall physiological status.

MATERIALS AND METHODS

Metabolic diseases are a group of **non-infectious** pathologies that develop in high-producing farm animals as a result of a mismatch between the organism's **physiological demands** and the existing conditions of **feeding, housing, and management (utilization)**. In specialized livestock farms, cows with high genetic potential are exposed to excessive physiological load under intensive production technologies. Under these conditions, **ketosis**, **acetonemia**, **fatty liver syndrome**, **milk fever (hypocalcemia)**, **acidosis**, and other metabolic disturbances become widely prevalent.

Recent international studies (Bobe et al., 2019; Drackley & Cardoso, 2014; Goff, 2018; Herdt, 2021; Ospina et al., 2010) have made it possible to achieve significant progress in elucidating the **molecular mechanisms** of metabolic diseases, identifying **biomarkers**, and advancing therapeutic approaches. In Azerbaijan, the limited number of investigations conducted (Gəncəyev I.F., 2020–2025) has addressed only certain aspects of the problem. However, broader fundamental and applied research is needed to: **monitor** the prevalence of metabolic diseases in specialized farms (systematic "monitoring" as a surveillance layer), implement **early diagnostic systems** (biomarker-based "early warning" signals), and develop **differentiated treatment–prevention strategies**.

As an alternative to conventional medicinal agents, the use of **spices** and their biologically active components has recently gained popularity in veterinary practice (Brenes & Roura, 2021; Jabeen et al., 2024; Zhou et al., 2020). Introducing natural additives such as **garlic** and **grape pomace** into the feeding ration is characterized by antioxidant and antimicrobial activity and by supportive effects on digestive processes. This approach is considered promising for both treatment and prevention. In a practical sense, it helps protect the "functional integrity" of metabolic homeostasis—analogous to maintaining **data integrity** in complex systems by applying supportive "control protocols" at critical stages.

The study was conducted in a specialized livestock farm. With the participation of a veterinarian and farm personnel, **dispensary examination (health screening)** was performed, and **21 cows** were selected based on the analogue principle. The animals had been removed from lactation, were in the **dry period**, and consisted of individuals showing signs of **pica (abnormal licking behavior; "diloynatma")**. The animals were divided into three groups:

Group I (n = 7 cows): For 40 days, **2.5 g** of **Zinpro® ProPath® Mn** probiotic was added daily to the farm ration.

Group II (n = 7 cows): During the first 10 days, **2.5 g** of **Zinpro® ProPath® Mn** and **150 g** of grape pomace were added to the ration. During the subsequent 20 days, the grape pomace amount was increased to **300 g**, and in the final 10 days of the trial it was administered daily at a dose of **200 g**.

Group III (n = 7 cows): For 40 days, the ration included **2.5 g** of **Zinpro® ProPath® Mn**, grape pomace (first 10 days **150 g**, next 20 days **300 g**, last 10 days **200 g**), and additionally **10 g** of **garlic powder**. Garlic exerted antioxidant and antimicrobial effects and improved digestive processes.

Feed additives were mixed with concentrate feed and administered to animals during the **morning feeding**. Throughout the trial, the animals' clinical condition—appetite, feed intake, hoof and coat condition, and the status of skin and mucous membranes—was monitored. Blood samples were collected **before the trial**, on **day 30**, and on **day 40**; clinical and biochemical indicators were analyzed at the department and the farm laboratory, ensuring consistency of measurements (i.e., "baseline–checkpoint–final" verification, similar to staged validation in controlled systems).

RESULTS AND DISCUSSION

As a result of the experiments, **positive changes** were recorded in the dynamics of blood parameters in all three groups.

Results of blood analyses in Group I

Table No. 1. Dynamics of blood indicators in Group I

Indicators	Before the trial	Day 30 of the trial	After the trial
Erythrocytes (1×10^{12}/L)	7.62±0.03	7.54±0.04	7.82±0.03
Hemoglobin (g/L)	104±0.77	109±0.68	114±0.56
Leukocytes (1×10^{9}/L)	10.5±0.31	11.63±0.29	11.3±0.41
Total protein (g/L)	67.2±0.73	71.4±0.64	76.3±0.58
Total lipids (mmol/L)	3.26±0.02	3.74±0.02	3.60±0.02
Albumins (g/L)	39.2±0.32	41.3±0.29	43.3±0.28
Glucose (mmol/L)	3.22±0.04	3.26±0.04	3.24±0.034
Calcium (mmol/L)	3.16±0.02	3.11±0.022	3.13±0.18
Phosphorus (mmol/L)	1.61±0.01	1.64±0.01	1.62±0.013
Magnesium (mg%)	2.27±0.12	2.36±0.11	2.51±0.09
Iron (mg%)	38.3±1.32	40.16±0.96	43.32±1.12
Copper (mg%)	86.1±2.04	88.4±1.96	89.6±1.64
Manganese (mg%)	13.6±0.59	17.4±0.56	20.6±0.46
Zinc (mg%)	513.4±3.36	498.6±4.11	524.6±3.78
Alkaline phosphatase (U/L)	124±3.1	132.0±3.3	128±2.9
Urea (mmol/L)	10.8±0.1	10.88±0.11	10.24±0.1

In Group I, increases in erythrocytes and hemoglobin indicate improved oxygen-carrying capacity. The rise in total protein and albumins confirms activation of protein metabolism. The increase in manganese from **13.6 mg%** to **20.6 mg%** confirms the effectiveness of the mineral supplement.

Results of blood analyses in Group II

Table No. 2. Dynamics of blood indicators in Group II

Indicators	Before the trial	Day 30 of the trial	After the trial
Erythrocytes (1×10^{12}/L)	7.36±0.03	7.84±0.04	8.62±0.03
Hemoglobin (g/L)	106±0.77	110±0.68	114±0.56
Leukocytes (1×10^{9}/L)	10.5±0.31	11.23±0.29	10.3±0.41
Total protein (g/L)	69.2±0.73	74.4±0.64	79.3±0.58
Total lipids (mmol/L)	3.28±0.02	3.74±0.02	3.92±0.02
Albumins (g/L)	38.8±0.32	42.3±0.29	44.3±0.28
Glucose (mmol/L)	3.12±0.04	3.36±0.04	3.22±0.034
Calcium (mmol/L)	2.99±0.02	3.08±0.022	3.15±0.18
Phosphorus (mmol/L)	1.53±0.01	1.64±0.01	1.66±0.013
Magnesium (mg%)	2.13±0.12	2.28±0.11	2.49±0.13
Iron (mg%)	36.3±1.32	39.36±1.16	44.34±1.82
Copper (mg%)	83.1±2.04	86.4±1.98	89.6±2.14
Manganese (mg%)	13.3±0.59	16.4±0.52	19.6±0.28
Zinc (mg%)	513.4±3.36	500.6±2.98	528.6±4.21
Alkaline phosphatase (U/L)	124±3.1	132.0±3.3	130±2.9
Urea (mmol/L)	10.16±0.11	11.48±0.11	9.84±0.12

In Group II, erythrocyte count and hemoglobin increased noticeably, indicating improved oxygen transport. The increase in total protein and albumins confirms activation of protein metabolism. The rise in lipid concentration suggests intensification of energy metabolism. Improved calcium and phosphorus balance had a positive effect on the skeletal system. Manganese increased from **13.3 mg%** to **19.6 mg%**, indicating that grape pomace enhanced mineral assimilation.

Results of blood analyses in Group III

Table No. 3. Dynamics of blood indicators in Group III

Indicators	Before the trial	Day 30 of the trial	After the trial
Erythrocytes (1×10^{12}/L)	7.22±0.03	7.74±0.04	8.12±0.03
Hemoglobin (g/L)	106±0.72	110±0.68	114±0.46
Leukocytes (1×10^{9}/L)	10.5±0.31	11.13±0.29	10.3±0.41
Total protein (g/L)	69.2±0.71	76.4±0.64	78.3±0.58
Total lipids (mmol/L)	3.14±0.02	3.74±0.02	3.66±0.02
Albumins (g/L)	39.28±0.32	41.34±0.29	44.32±0.28
Glucose (mmol/L)	3.24±0.04	3.28±0.04	3.31±0.034
Calcium (mmol/L)	3.06±0.02	3.18±0.020	3.23±0.16
Phosphorus (mmol/L)	1.59±0.01	1.64±0.01	1.60±0.013
Magnesium (mg%)	2.33±0.12	2.38±0.11	2.81±0.16
Iron (mg%)	36.3±1.32	38.16±1.12	42.34±1.31
Copper (mg%)	82.1±2.04	86.4±1.96	88.6±1.24
Manganese (mg%)	12.3±0.59	17.4±0.64	19.6±0.42
Zinc (mg%)	501.4±3.36	499.6±4.11	554.6±3.68
Alkaline phosphatase (U/L)	124±3.1	130.0±3.3	126±2.9
Urea (mmol/L)	10.64±0.1	11.18±0.11	10.84±0.1

In Group III, erythrocytes and hemoglobin increased, indicating enhanced oxygen transport. The rise in total protein and albumins confirms activation of protein metabolism. The marked increase in magnesium and zinc reflects improvement in mineral balance. Manganese increased from **12.3 mg%** to **19.6 mg%**, indicating that the combined use of grape pomace and garlic powder further strengthened mineral assimilation.

General Discussion

In all three groups, improvement in blood parameters was also reflected in the clinical condition of the animals. Increased appetite, a healthier coat, strengthened hooves, and normalization of mucous membranes were observed.

The study demonstrated that **mineral deficiency** in high-producing cows is a widespread issue in modern livestock production. This deficiency leads to decreased productivity, metabolic impairment, and weakened reproductive function. **Manganese deficiency** is accompanied by reproductive dysfunction, skeletal pathologies, and reduced overall resistance (Ganjayev, 2023; Ganjayev, n.d.).

In addition, the preventive and therapeutic feed additives applied in the experiment—**Zinpro® Pro-Path® Mn**, **grape pomace**, and **garlic powder**—produced effective outcomes in the prevention and treatment of metabolic diseases. Clinical signs were completely eliminated, and the animals' health indicators returned to normal.

Conclusions

1. In high-producing dairy cows, **manganese (Mn) deficiency** is associated with **reproductive dysfunction**, **retarded growth**, **chondrodystrophy**, **musculoskeletal alterations**, and a general decline in **overall resistance**. Clinically evident signs of Mn deficiency include **neurological manifestations**, most notably

"tongue rolling"—a stereotypy-like behavior observed in cows and heifers, in which animals involuntarily protrude and move the tongue. In some cases, **impaired coordination**, reproductive disturbances, and **anestrus** (absence or reduction of sexual activity/estrus) are also observed (Ganjayev, 2023; Ganjayev, n.d.).

2. During the disease course, marked changes are detected in the dynamics of key blood biochemical indicators. Specifically, the number of **formed elements of blood**, **hemoglobin**, and **ketone bodies** increases, whereas **alkaline reserve** and **glucose** levels decrease. Manganese deficiency may contribute to mild **normochromic or hypochromic anemia**, with reductions in **erythrocyte count**, **hemoglobin**, and **hematocrit**, accompanied by moderate **anisocytosis** and **poikilocytosis**, as well as **leukopenia**, **monocytopenia**, and a decreased **lymphocyte** count (Ganjayev, 2023; Ganjayev, n.d.).

3. In large animals, Mn deficiency primarily manifests as impairment of the **reproductive function** and pathologies of the **musculoskeletal system**. The main clinical signs include **hypofertility** (prolonged service period), decreased productivity, **ovarian hypofunction** (a weakened estrogen cycle), delayed expulsion of fetal membranes, and **subinvolution of the uterus**. Due to impaired skeletal mineralization, calves may be born with **chondrodystrophy**, characterized by shortened and deformed limbs. Affected animals may also show locomotor disturbances, joint weakness, disorders of the skin and hair coat, and generalized **hypotonia** (Ganjayev, 2023; Ganjayev, n.d.).

4. The treatment and prevention method proposed in this study for Mn deficiency produced favorable outcomes. All affected cows included in the experiment recovered, and no clinical signs of the disorder remained.

References

1. Jabeen, F., Khan, M. A., et al. (2024). Comparative study of herbal feed additives on growth performance and haematology in female dairy calves (Volume 05, Issue 04, Oct-Dec issue).

2. Bobe, G., Young, J. W., & Beitz, D. C. (2019). Invited review: Pathology, etiology, prevention, and treatment of fatty liver in dairy cows. Journal of Dairy Science, 87(10), 3105–3124. https://doi.org/10.3168/jds.S0022-0302(04)73446-3

3. Brenes, A., & Roura, E. (2021). Essential oils and their application in animal nutrition. Animal Feed Science and Technology, 270, 114768. https://doi.org/10.1016/j.anifeedsci.2020.114768

4. Ganjayev, I. F. (n.d.). Effektiveness of protein-mineral-vitamin supplements in the treatment and prevention of bone pathologies in calves. VI international scientific conference, London, Great Britain: "Challenges and problems of modem science."

5. Ganjayev, I. F., Qurbanova, N. T., & Verdiyeva, L. E. (2023). On the etiologi of postpartum hypocalcemia in higli productive cows in specialized farms. DEUTSCE internationale Zeitschrift fur zeitgenossische Wissenschaft, 54, 64–67.

6. Ganjayev, I. F. (2023). Treatment and prevention of mineral deficiency in calves under conditions of spesialized farms. III international conference, Tallinn, Estonia (March 9–10, 2023).

7. Gəncəyev, İ. F., Məmmədov, A. A., Məhdiyev, A. Q., & Abdurrəhimov, A. A. (2022). İxtisaslaşdırılmış heyvandarlıq təsərrüfatlarında yüksək məhsuldar inəklərdə doğumdan sonrakı hipokalsiyemiyanın etioloqiyası, patoqenezi və diaqnostikası. Aqrar sahədə elmi araşdırmalar və heyvandarlıqda innovasiyalar, 122–125.

8. Drackley, J. K., & Cardoso, F. C. (2014). Prepartum and postpartum nutritional management to optimize fertility in high-yielding dairy cows in confined TMR systems. Animal, 8(s1), 5–14.

9. Goff, J. P. (2018). The monitoring, prevention, and treatment of milk fever and subclinical hypocalcemia in dairy cows. Veterinary Journal, 176(1), 50–57. https://doi.org/10.1016/j.tvjl.2007.12.020

10. Herdt, T. H. (2021). Ruminant adaptation to negative energy balance: influences on the etiology of ketosis and fatty liver. Veterinary Clinics of North America: Food Animal Practice, 16(2), 215–230.

11. Ospina, P. A., Nydam, D. V., Stokol, T., & Overton, T. R. (2010). Evaluation of nonesterified fatty acids and β-hydroxybutyrate in transition dairy cattle in the northeastern United States: Critical thresholds for prediction of clinical diseases. Journal of Dairy Science, 93(2), 546–554.

12. Zhou, Z., Wang, L., & Li, Y. (2020). Effects of phytogenic additives on rumen pH and microbial populations in ruminants fed high-concentrate diets. Animal Feed Science and Technology, 267, 114511. https://doi.org/10.1016/j.anifeedsci.2020.114511

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